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STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING AND IRRIGATION

BULLETIN No. 6

IRRIGATION REQUIREMENTS OF CALIFORNIA LANDS

BEING

APPENDIX "B"

TO

Report to the Legislature of 1923

ON THE

Water Resources of California



CALIFORNIA STATE PRINTING OFFICE
SACRAMENTO, 1923

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FOREWORD.

The legislature of 1921 appropriated \$200,000 for an investigation of California's water resources by the State Department of Public Works, Division of Engineering and Irrigation. Accordingly, an engineering investigation has been completed and a report transmitted to the legislature on January 1, 1923. The great mass of data collected and the complex analyses thereof made it advisable to present much of this information in separate volumes. Four of these are in print, entitled:

APPENDIX "A" "Flow in California Streams." Bulletin No. 5, State Department of Public Works.

APPENDIX "B" "Irrigation Requirements of California Lands." Bulletin No. 6, State Department of Public Works.

APPENDIX "C" "Utilization of the Water Resources of California." Bulletin No. 7, State Department of Public Works.

APPENDIX "D" "Relation of Settlement to Irrigation Development." Bulletin No. 8, State Department of Public Works.

Chapter 889 of the 1921 Statutes, which authorized this investigation, provided for the appointment by the Governor, of a Consulting Board to advise with the Department in their endeavors. The following were appointed by Governor Stephens:

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ACKNOWLEDGMENT.

Much data have been contributed to this report by public and private offices without which the Department would have been wholly unable to produce this volume. The Department desires to publicly express its sincere appreciation to the parties who, through the furnishing of these data, have made it possible for the Department to increase its service to the public several-fold in publishing this report.

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Plate IV was prepared in the office of the Grunsky Engineering Corporation by E. L. Grunsky

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CHAPTER I.

AGRICULTURAL LANDS.

The agricultural lands of the State of California comprise a total area of 23,000,000 acres¹ or 35,000 square miles. These lands are located on the floors of the valleys and in the foothills and plateaus of the state; the remainder, or three-quarters of the state's area, is either mountainous with steep or precipitous slopes, soilless, too rocky for cultivation, or irreclaimable desert with barren or alkaline flats. Thus only a quarter of the state's total area is agricultural.² This comparative relation is strikingly contrasted by the proportion of agricultural lands of the whole United States where a half of the total area is agricultural.³

California's agricultural lands are those portions of the state that have suitable soils, disposed in appreciable areas of regular surface conformation, favorable climate, and other requisite conditions for the production of harvestable crops. Included in these, are lands at present deficient in natural moisture, but more or less conveniently situated for the ultimate acquisition of an accessory water supply.

Of the non-agricultural region, the mountains and their precipitous and rocky terraces, through glacial action, weathering and erosion, have supplied the alluvial earth that the rivers and streams have conveyed and deposited to become the fertile and productive soil of the agricultural valleys.

The mountainous portion of the state's non-agricultural lands, while precipitous, rocky or soilless, and comprising three-fifths of the area of California, is indispensable, nevertheless, to the development of the agricultural lands in being the collecting area for precipitation and its concentration into streams, without which collected waters much of the agricultural area would be no more productive than the desert. The vast mountain regions of California are two and a half times the area of the agricultural lands, and occupy well over half the space inclosed within the state's boundaries. The relative areas and locations of the agricultural and mountainous lands of the state are shown on Plate V, "Map of Agricultural Areas and Duty of Water Sections." The agricultural lands are there delineated in green.

The most extensive and continuous body of agricultural land lies in the long and centrally located valley between the two main mountain ranges of the state, the Sierra Nevada and the Coast Range Mountains, being bounded on the north by Mount Shasta and on the south by the closure between the Coast and the Sierra Nevada ranges at Tehachapi Pass. This valley, the north half of which is the Sacramento and the

¹From Irrigation Map of California, U. S. Department of Agriculture, 1920, 22,506,000 acres. (Exclusive of areas included within cities, principal towns and the channels of the larger streams.)

²Agricultural Census, U. S. Census Bureau, 1920, 35,255 square miles out of total area of the State of California of 157,857 square miles, which total contains 2205 square miles of water surface.

³Excluding Alaska, Agricultural Census, 1920.

south half the San Joaquin, is four hundred and fifty miles long and averages fifty miles wide, with a total area of 21,000 square miles, or 14,000,000 acres of tillable land. This great valley contains three-fifths of the total agricultural lands of California; thus the principal portion of the farming area lies along the axis and in the center of the state.

The remainder of the agricultural land is distributed along the borders of the state, and in parcels that are relatively small compared to the lands of the central valley; except for portions south of the Tehachapi Pass. Here one-tenth of the total agricultural lands of the state lies west of the crest of the mountain range that separates the Pacific Coastal plains from the desert, and one-tenth lies on the eastern side of this dividing range and principally in Imperial, Antelope and Victor valleys; along the eastern border of the state, east of the Sierra Nevada Mountains, one-fortieth lies in the valleys south of Lake Tahoe, and one-twentieth in the mountain valleys north of Lake Tahoe and on the plateaus east of Mount Shasta; along the westerly border of the state, three-fortieths lie in the coastal valleys of the Pacific slope of the Coast Range Mountains and between the Oregon line and the Santa Barbara Channel.

These agricultural lands produce, or are capable of producing, the grains, fruits, berries, grapes, vegetables, and the other farm products of the state, and slightly over half¹ of this total agricultural producing area was farmed in 1920. The history of the development of these agricultural lands is graphically represented on Plate I, "Expansion of Agricultural Industry in California."

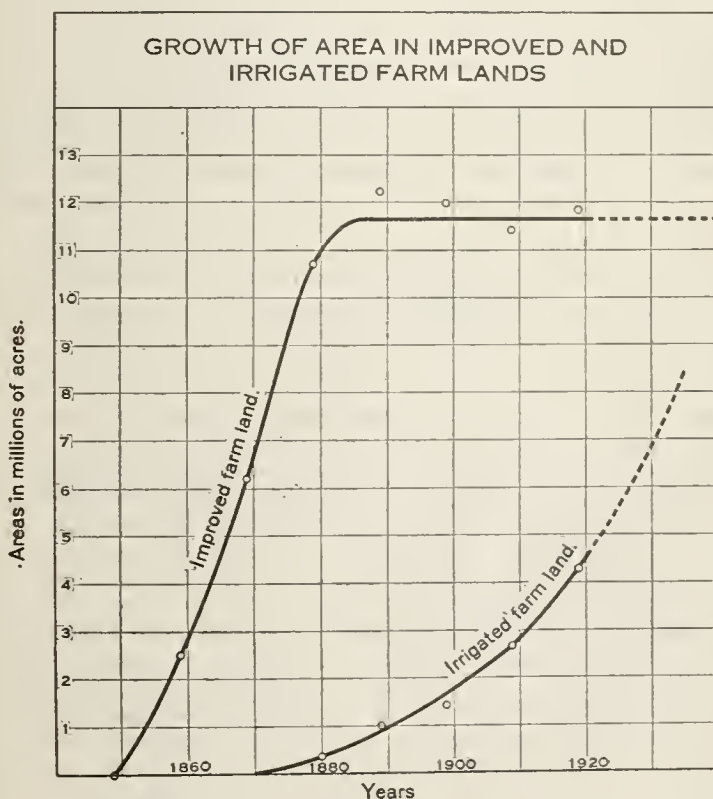
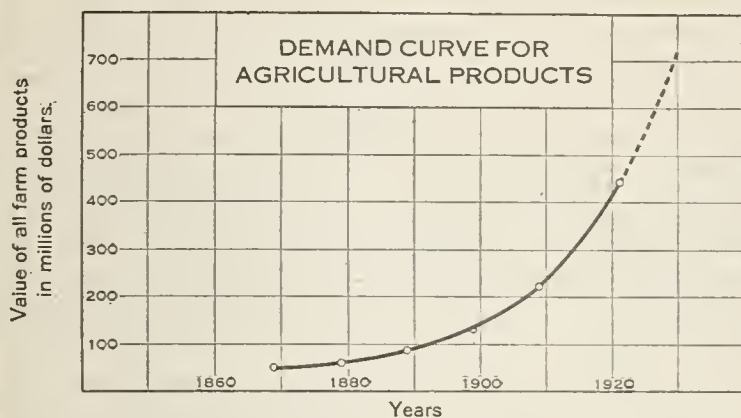
On Plate I, the demand for agricultural products from 1870 to the present day is shown by a curve expressing the values of agricultural produce marketed in the various years.² A second curve shows the expansion of the improved area in farms as this demand increased. A third curve, taking its origin with the beginning of irrigation in 1870, depicts the increase in the farming area receiving irrigation waters in succeeding years. The upwardly directed sections of these curves, which are drawn to connect the values in successive years, represent increase in value or expansion of acreage. The steeper slopes indicate a greater rate of increase, and sections parallel to the base show that no increase occurred. The curve of demand for agricultural products progresses steadily upward and at an increasingly steeper inclination with the passing of time as it approaches the present day, thus indicating the accelerated rate at which the demand for the state's farm products has continued to grow.

The increasing demand for California's agricultural products that occurred prior to 1870, was satisfied by dry farming additional areas of land each succeeding year. The curve expressing the expansion of the improved area in farms, shows that this extension of area continued up to the year 1885. At this time the curve turns and becomes parallel to the base. This indicates that there has been no increase in the area of the total land under cultivation since that date.

¹Twelve million out of twenty-three million, or 52 per cent. Fourteenth U. S. Census, 1920.

²U. S. Census Reports.

Plate I.



EXPANSION OF AGRICULTURAL INDUSTRY IN CALIFORNIA

STATE DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING AND IRRIGATION
CALIFORNIA WATER RESOURCES INVESTIGATION
CHAPTER 88-1521 STATUTES

With 23,000,000 acres of arable land in the state, the extension of agriculture to new lands stopped at 12,000,000 acres. Since the demand for the products of the agriculturist continued to increase, and at an accelerated rate after the expansion of the farming area had ceased, every circumstance and condition existed for the continuance of the extension of agriculture to new areas if it were possible. As a result of the unprofitable farming conditions obtaining on the remaining uncropped 11,000,000 acres, the area under cultivation did not further increase. The experience of the practical agriculturist limited the total area farmed to 12,000,000 acres. Statistics presented later in this report indicate that with the 12,000,000 acres cultivated, all of the state's agricultural area with sufficient natural moisture to mature a profitable crop had been brought into use, together with some additional area having inadequate natural moisture, but for which accessory supplies were developed economically.

After 1885, with the demand for California's agricultural products constantly increasing, the state had no additional area that could be profitably utilized for agriculture. In response to the continuing favorable market, a more intensive farming of the land already under cultivation resulted; for California, favorably situated, its fertile agricultural soil not producing to capacity under dry farming conditions, required only that additional water be applied to these lands to multiply the yield. The practical farmer, responding to the market created for his products by the ever-growing demand, increased the yield of each acre by supplementing the soil's natural moisture with water applied through irrigation. The increase in the area irrigated in the years succeeding 1885, after the increasing demand for the state's farm products could be no longer satisfied by enlargement of the farmed area, is depicted on Plate I¹. Although starting in 1870, the area irrigated did not increase very rapidly until the years following 1885. This curve of irrigated area and the curve of demand for agricultural products closely conform in shape. The similarity of these curvatures in the succeeding years, expresses the dependency of agriculture upon irrigation and the effect of irrigation in augmenting the yield to a production commensurate with demand; for California's lands, potent in possibilities, needed only the accessory moisture that irrigation supplied to enhance their yield that the state might respond to the demand for its products. The upwardly directed paths of both the demand curve and the curve of irrigated area, ascending with greatly increased steepness as they approach the present day, show that still more intensive farming must be practiced in the future and that the irrigated area must expand at a still greater rate than in the past, or the state's progress will be retarded through agricultural production failing to meet the demand.

Through the state's response to the demand for its agricultural products by the more intensive farming of its rich agricultural lands; and because of the introduction of irrigation and the continued extension of this practice, it has come about that California, eighteenth in the area of land farmed among the states of the Union, but with favorable climate and fertile soil, is in the fifth² position in value of farm crops.

¹"Expansion of Agricultural Industry in California."

²Fourteenth U. S. Census, 1920.

CHAPTER II.

CLIMATOLOGY.

The California year is distinctive in having but two well-defined seasons, summer and winter. This feature arises from the transitional periods, spring and autumn, being short and devoid of distinguishing features other than that they are intermediate between the more clearly defined seasons of summer and winter. The summer, or growing period, is long, warm and generally rainless; the winter is the dormant period, or the interval of retarded growth in plant life in the annual cycle, and is normally short, cool, and at times stormy. Most of the precipitation occurs during this season of winter.

The mountains and the proximity of the thousand mile coast line of the Pacific Ocean, modify California's climate so that only moderate seasonal fluctuations of temperature occur over most of the state. Any great extremes of heat and cold that do occur, are confined principally to the non-agricultural areas of the mountains and deserts of the state. For California generally, the mean summer temperatures and mean for the winter show a less departure from that of the entire yearly temperatures than do similarly compared mean heat measurements for the states adjoining California, or those located eastward and included in the same latitude.

The seasonal fluctuations of temperature, the duration of periods of heat and cold, and the extremes of temperature reached in the daily and yearly cycle, all have an effect on plant life. Agricultural plants require appreciable intervals of favorable growing temperature that they may attain to mature growth and reach an annual harvest bearing stage. This growing period must necessarily be continuous and for the greater number of agricultural plants, the growing season must be exempt from freezing weather or long continued chilling cold. Growing plants generally can withstand temperatures slightly below freezing for short intervals without serious consequences, except that a few degrees of frost, even for short periods, is damaging to tender plants when they are passing through critical stages of growth, as budding, blooming or setting of fruit. Dormant plants can withstand varying degrees of cold, ranging from six to seven degrees below freezing for an hour or so for orange trees, to fifty degrees below freezing for mature grape vines.

Although the frost-free period, which is the time when temperatures are continuously above freezing, is known as the growing period, most crops will make little if any growth on days when the average daily temperature is below 43 degrees and because of the variations that take place in the daily temperatures between noontime warmth and the cooler nights, the first month of the growing season is usually that month in which the mean temperature is above 49 degrees.

The mean monthly precipitation and temperature, as well as frost-free periods for sixteen illustrative towns located in these agricultural sections, is graphically presented on Plate III, "Illustrative Clima-

tology of Agricultural Lands."¹ The upper section of this plate shows, by colored bars drawn upwardly from the base line, the mean monthly precipitation that has occurred at the Weather Bureau's station located in the town shown below the foot of the bar. These bars in intercepting the cross lines give the mean monthly precipitation in inches of depth. The longer lengths of these upwardly directed bars indicate that greater rainfall has taken place at these stations, the shorter lengths that the precipitation has been less. The middle section of Plate III² represents, by similarly colored bars, the mean monthly temperatures that have prevailed during the period of record at the same Weather Bureau stations. In a like manner, the longer bars show higher mean monthly temperatures, and the shorter bars that the temperatures have been less. The lower section, designated "Frost-Free Period," has transverse bars of like color opposite the names of the Weather Bureau stations, and gives a pictorial representation of the absolute frost-free period by means of solid colored bars. The shading lines, cross drawn in like colors and extending from the extremities of the solid bars, show within the limits of the extreme ends the average frost-free period that has obtained at these stations during the years of record.

These bars, one to a town in each of sixteen sections of the state and covering every month in the year, illustrate in a graphical way the main climatic characteristics of the state's agricultural lands. The location of the towns and the agricultural lands is presented with other data on Plate V, "Map of Agricultural Areas and Duty of Water Sections."

Illustrative of the climate in their respective sections shown on this map, the bars on Plate III² show that almost without exception the precipitation, in amounts to be of much value to agriculture, is confined to the months of November, December, January, February and March, while the period of favorable growing temperature is from March to November, inclusive. During this nine-month period, with the exception of March and November, the rainfall is negligible at almost all the stations of record, and the only supply of water available to the growing plant is the moisture stored in the soil from the winter rains. With plant growth started, some time is consumed before additional waters, above that stored in the soil, are required. In localities where the natural rainfall is inadequate or does not occur in sufficient amounts at the needed times, and where other methods of watering are used, the first month during which these additional waters are required is that during which the mean temperature is above 52 degrees. However, with all other elements of climate favorable to agriculture, by the utilization of the soil's natural moisture stored from the rains of the previous winter and supplemented by the light spring rains, although deficient, harvestable crops of limited varieties have been successfully grown over a large portion of California's farming lands. In localities where rains adequate for dry farming, occurred with sufficient regularity in succeeding years, the venture was profitable; but the limits to the agricultural industry of California, when conducted without a supplementary supply of water for the growing plants during the long dry summer period, was reached about the year 1885.

¹Data from records of the U. S. Weather Bureau.

²"Illustrative Climatology of Agricultural Lands."

Although the successful farming of the past has demonstrated that crops may be grown and that plants will endure the moisture deficiencies of the summer period, the experiences recorded on Plate I,¹ and the climatological data of Plate III,² are convincing that the agricultural areas of California can not produce to the full advantage of the rich soils and favorable climate of the state without an increase in the supply of moisture during the growing season over that supplied by the meagre summer rains and the holdover moisture in the soil from the winter season. To attain maximum productivity on agricultural lands in all parts of the state, it is clearly necessary to supplement the natural moisture of the soils by applying accessory waters to the growing crop during the summer season. In practice this is called irrigation. It consists of the diversion of water from a lake or flowing stream, or pumping from underground waters, and the conveyance and application of this water to the soils in the agricultural areas. It is this utilization of precipitation that has fallen on other than cropped areas, the collecting, conveying and applying of such waters to the tillable soil and the growing crops, that constitutes our science of irrigation.

Three-fifths of the area of the state is occupied by lands that are non-agricultural, but useful for the collecting of precipitation to supplement the deficient natural moisture of the agricultural lands. Higher in elevation, precipitation falls in greater abundance on these mountainous lands. While the valleys in which the agricultural lands of the state lie, for the most part receive between five and twenty inches in depth of rainfall per year, a depth of over twenty inches is mostly confined to the mountainous areas. The annual quantity also varies, in general, increasing from south to north, from little more than zero in the Imperial Valley near the Mexican boundary, to 100 inches or more per year in the north coastal areas close to the Oregon line.

In the localities of lesser rainfall, irrigation is absolutely essential to the production of crops. In the localities of greater rainfall, irrigation would be unnecessary if the total precipitation were distributed uniformly throughout the year. Even in these areas, the natural soil-moisture is insufficient and is either exhausted or so greatly reduced early in the summer that irrigation becomes commercially profitable. The increased productivity occasioned by an adequate supply of soil-moisture, yields returns greatly exceeding the costs of accessory water to obtain it. The greater certainty of maturing the crops and the increased yield under irrigation, make an accessory supply a necessity for maximum production in every section of the state. On no occasion where waters have been conveyed, distributed and applied to growing crops have the results not been definitely and decisively conclusive that the application of waters periodically and in proper amounts, to the cropped area, has assured a greater yield and a better product.

The distribution of precipitation over the state is exhibited in graphical form on an isohyetose map, which shows how rainfall varies with locality. On this rainfall map, presented as Plate IV, "Isohyetose Map of California," points of equal mean annual precipitation are connected by lines passing through them. Every obtainable measurement of rainfall made in the state, comprising the records of 728 observation

¹"Expansion of Agricultural Industry in California."

²"Illustrative Climatology of Agricultural Lands."

stations, has been collected and utilized in the preparation of this isohyete map. Locations of these observation stations and places of record are shown by symbols on the map. The number adjacent to each symbol marking the location of the station, refers to Table 4, "Precipitation Data Used in Constructing Isohyete Map," in which is tabulated the data from which the map was prepared. Table 5, "Precipitation Stations Used in Constructing Isohyete Map," lists the rainfall stations in the alphabetical order of their names and carries opposite each name, a number by which the station is designated on the map and in Table 4.

The mean annual precipitation, which has been pictured on the isohyete map, is either the observed or it is the estimated average annual rainfall for the fifty-year period that has just been concluded. Comparatively few of the rainfall stations have records covering this half century. However, in the instances where they did not, the record of the years of actual measurement was extended to complete the record of the precipitation for the fifty-year period, through comparison with the chronicles of adjacent stations that had more extensive records. For this expansion, so necessary to make fuller records available for the interpretation of the sequence and predominant features of annual precipitation through long periods, use was made of factors called "indices" of wetness." These indices give numerical value to the relation that exists between the wetness of one year and the wetness of another. Wetness varies for different years in the amounts of rain falling and a ratio is obtainable that expresses this wetness for one year in terms of another year. This index for any one year is the ratio of the wetness or annual precipitation for that year, to the average precipitation for the fifty-year period. These indices or ratios form a series, each one typical of a successive year, and have a relation, one with another, identical with the actual values of the annual rainfall. Table 4¹ tabulates the data of the years for which rainfall measurements were made at each station, and the average rainfall for that period. This average for the years of measurement at each of the stations of short record, was increased or decreased to obtain the estimated mean for the fifty-year period. The increment added or amount subtracted was the proportional quantity that was required to change the average of the indices of wetness, for the years of measured rainfall, to the average of the indices for the fifty-year period.

This isohyete map shows the general tendency toward greater precipitation in the higher mountain regions where a depth of more than 70 inches is reached near the northern summits of the Coast Range. The elevated peaks and tablelands of the western slope of the Sierra Nevada Mountains receive a mean precipitation of from 50 to 90 inches compared to depths of from 5 to 25 inches occurring in the valley between the two ranges. It is also discernible on this map that the rainfall over the extensive and continuous areas of agricultural land in the San Joaquin and Sacramento valleys, is less in depth and more uniform than over the mountainous area. While the precipitation

¹"Precipitation Data Used in Constructing Isohyete Map."

²These indices are developed for every division of the state from the records of two hundred and sixty stations of the United States Weather Bureau, and are presented as a part of Appendix "A," to this report, "Flow in California Streams," Bul. No. 5, State Department of Public Works.

varies from 1 to 100 inches in depth over the state, this great valley in the center of the state, containing the bulk of California's agricultural land, receives 15 to 25 inches in the north half, and the south half receives only 5 to 15 inches. South of Tehachapi Pass, the southern California coastal valleys, lying to the west of the dividing range, have a rainfall of from 9 to 15 inches a year. On the eastern side of this mountain range, dividing the coastal plains from the desert, lies a great expanse of territory, one-fifth of the total area of the state, which receives less than 5 inches of rainfall per annum. To the north and along the eastern border of the state, the mountain valleys lying east of the Sierra Nevadas and south of Lake Tahoe, have a mean precipitation of from 5 to 25 inches; those north of Lake Tahoe and on the mountain plateaus east of Mount Shasta, receive from 10 to 20 inches per year. Along the western border of the state, on the Pacific slope of the Coast Range Mountains, the agricultural valleys north of Cape Mendocino and west of Mount Shasta, have a precipitation of from 20 to 75 inches; the valleys from Mendocino Cape to San Francisco Bay, receive from 20 to 50 inches per year. The valleys on this same slope, between San Francisco Bay and the Santa Barbara Channel, have a rainfall that varies in depth from 10 to 25 inches per annum.

The annual precipitation on all these areas varies greatly from year to year. Long continued records of rainfall give, when averaged, a mean depth of annual precipitation which shows the quantity of water that should be expected to fall in any one year; but the precipitation actually occurring may depart widely from the average computed from full records covering extensive periods of time. The precipitation in any year may be expected to occur in depths exceeding or falling short of the fifty-year mean with equal likelihood, except that wet and dry years appear in the record by groups. Records and information have not been accumulated for a sufficiently long time to determine the sequence with which these groups of wet or dry years may occur, the number of years in a group, or the widest departures from the mean annual rainfall that may be expected to take place in any year. So far as human experience carries, the longer records of a half century or more, probably contain the extremes which might ordinarily be expected. Precipitation for any one year may for this reason have a wide variation from the mean, but with the passing of time, the departures tend to equalize, effects of wide variation are suppressed, and the mean annual precipitation of the past gives the most probable depth of precipitation that may be expected to occur in the future.

Adequate precipitation desirably distributed, propitious temperature, and fertile soil, combine to make abundantly productive agricultural localities that yield generous harvests to human effort. California's farm lands, favorably located and possessing naturally all these requisites but a rainfall commensurate in amount and fittingly distributed, require that accessory water be applied to the cropped soil during the long growing season to attain maximum productivity.

CHAPTER III.

DUTY OF WATER FOR IRRIGATION.

Plant life and the physiological processes taking place in the vegetable structure through which the seed germinates, maintains its life and grows to maturity, is one of absorption, transformation and storage in its cells, of materials available to it from its environs. Plant life requires sunshine, moisture, and mineral and organic food for normal physiological functioning in sustaining life and for nourishing it to mature growth. Rooted in place, plants have at their command only such of these elementary necessities as are naturally about them or are conveyed to them by the hand of man.

Dependent upon the resources of their immediate surroundings, without means of effecting their own relief during adversity, plants are of necessity, hardy and tenacious of life and do not succumb except to very unfavorable circumstances or long endured privations. Distributed around the earth and through all latitudes, the plant organism has shown by its distribution and the diverse conditions under which it prospers, a remarkable facility in adapting itself to unpropitious environments. In such regions, growth is slow and plant products are scanty, but with the introduction of advantageous factors into the surroundings or on transplanting into more favorable localities, the plant responds with more luxuriant growth and abundant fruits. Because of this facile adaptability to environment, the plant requirements for any one of its elemental necessities, sunshine, moisture, or food supply, are as variable as the numerous combinations of circumstances under which they are accustomed to mature.

Moisture is required, however, by growing plants in far greater quantities than mineral and organic foods, for in addition to its incorporation into the cell structure of the plant, there is a large amount evaporated from all the surfaces of the stalks and leaves that are exposed to the atmosphere. The root system of the plant extracts moisture from the surrounding soil and takes it into the plant structure to supply this two-fold need for water; that required for incorporation into the cells and framework, and that portion which evaporates from the exposed surfaces during the physiological process of transpiration. The quantity of water needed for these purposes is large, but varies greatly with the different varieties of plants as well as with the circumstances of their surroundings. The moisture utilized by the plant for incorporation into its structure and product, varies from 10 per cent of its total weight in grain, to 80 per cent in tuber crops and 90 per cent in fruits. Of all the moisture absorbed by the root system, however, that incorporated into the structure of the plant is but a very small part. Much the larger portion is evaporated to the atmosphere from the leaves and other exposed surfaces of the plant. The type of plant and the conditions under which it grows, especially the fertility and tilth of the soil, cause this quantity to fluctuate between wide limits.

Greater quantities are also evaporated when the supply of soil moisture is more abundant.

Much scientific effort has been expended to determine the minimum quantity of water required to bring plants of various agricultural types to an harvestable maturity. The moisture transpired during the epoch of plant growth from germination to harvest, in fluctuating with all the circumstances of the environment, is so variable, however, that the experimentors have produced a variety of figures differing from each other by several hundred per cent.

The total moisture required to make the environment favorable, is greater in volume than the minimum quantities actually used in plant growth. Water in the interstices of the soil is drawn by gravity and capillary attraction, and portions are removed by these forces beyond the reach of the plant roots. The moisture carried by gravity to greater depths, as well as that drawn to the ground surface by the capillary powers of the soil to be dissipated through evaporation, are alike lost to the plant. That the environment be favorable for plant growth, there must be ample moisture in the soil to supply the actual amount required for absorption into the plant structure by its root system, after portions have been removed from the reach of the root system by the continually acting and unavoidable natural attractions of gravity and capillarity. The total amount of water that can be stored in the pores of the soil at any one time is quite limited. While pore space in soils varies from a third to half its volume, not more than one-half of this pore space can be occupied by water for any considerable period of time without detriment to plant growth. Plants require air in the soil as well as moisture to effect the chemical and bacteriological processes concurrent with the abstraction of their nourishment from the soil, and if the pore space of the soil is too filled with water, air will be excluded or will not be present in sufficient quantity for plant needs. Without sufficient air in its pores, the soil takes on a condition called "sour," which is commonly known to be unfavorable to plant growth. The most favorable conditions for plant growth require that moisture be supplied to the soil of cropped areas at intervals and in quantities less than the maximum that the soil will absorb. With applications made in this manner, the supply in storage in the pores of the soil, is never much above or much below an amount that is most favorable to plant growth. The natural replenishment of the soil moisture through rainfall, as the climatological data shows, occurs in the dormant period of plant life, or during the early part of the growing season. To replenish soil moisture during the growing season requires a supply accessory to that of nature.

The amount of water required of the accessory supply and the frequency of replenishment, concern not alone that needed for absorption by the plant and the quantity that is removed from the proximity of the plant roots by gravity and capillarity, but also an additional quantity. From the very point at which these accessory waters are taken from their natural location, into conduits for conveyance to the place of use, throughout this entire course, losses occur. Seepage into the earthen banks confining the waters, leakage through walls and joints of constructed channels and passages, and percolation to the sub-

soil, are quantities varying in amount and are often unavoidable or impractical to prevent economically. With the pouring of the waters on to the cropped soil, a further portion of the water is dissipated. The long ribbons of furrow-confined waters of slight depth, or the extensive and shallow sheet of water flooding the ground surface when the irrigation waters are disposed upon the cropped area, and the large expanse of wetted soil, give unexcelled opportunities for evaporation to the atmosphere both during and after the spreading of the waters, and a great deal of water is so dissipated. In localities of porous soils and free drainage through subsoil, much water may percolate immediately to depths beyond the reach of plant roots in those parts first wetted, even before the spreading waters have made their way to the borders of the field. The loss of water involved in the pouring out and spreading of the accessory waters upon the cropped land is great or small, depending upon many circumstances, most of which are controllable by man. The manner of spreading the waters, the time required to wet the field, and the proficiency displayed in application, restrain the wayward waters to more or less beneficial purposes. With the greater or less expenditure for leakless conduits to convey the water to the point of use, and for preparing the fields and making provision for a quicker and more even spreading of the water, the diffusion losses that serve no useful purpose, and take place when applying the irrigation waters to the land, may be made smaller or larger. Other circumstances beyond the control of man affect the magnitude of these losses, but to a lesser degree. The type of soil, its variation throughout the field and its dryness at the time of irrigation, the freedom of drainage through the subsoil, the local climate and weather conditions prevailing at the time of irrigation, all tend to enhance or lessen the diffusion losses, but do not control their essential magnitude. For the effect of these elements, in increasing the proportion of water lost before serving any useful purpose, may be largely offset by the expenditure of money to conserve the water, by providing watertight conduits for conveying the waters over the ground and through the fields to its place of emission for use, for retaining the waters for beneficial service, for guarding it from leakage and evaporation, and for delivering it undiminished to the zone of the plant roots. The economies of irrigation and agricultural production are thus the determining factors in coping with application losses; to conserve or to permit waste, expenditure is balanced against returns, the value of water, the value of the crop; and the margin of profit decides. The losses occurring in the application of irrigation waters may equal half the total water spread upon the land. The practical working quantity of water required of an accessory supply, to furnish adequate supplementary moisture for growing plants must include sufficient to provide for all these various amounts dissipated as the water flows from its natural source through man-made channels, pipes and conduits, and pours out upon the soil, and before any is incorporated in the structure of the plant and product.

This practical working quantity, by which the needs of cropped areas may be expressed and water requirements of localities may be compared, is the greatest utility when expressed as the amount of water needed for a unit area of cropped land. The "Duty of Water"

is the name used for this practical working quantity of water. Originally an expression for the area of land that a measure of water would irrigate, flowing continuously through the irrigation season, custom has inverted the first meaning and more conveniently utilizes the term "Duty of Water" to name the quantity of irrigation water required to furnish an adequate supplementary supply to the soil moisture throughout one season on a unit area of land. This quantity is usually expressed as feet of depth on the land, meaning the depth that the total amount of water required for one acre in one year would cover its surface if it were all accumulated and confined above the surface of that acre. Conventional use has resulted in dropping the unit of area, the acre; and of time, the year; and these are now implicitly contained in the phrase "Duty of Water."

Qualifying terms are in common use, such as "Net" and "Gross." "Net Duty" is the quantity of water measured at the point nearest to its entry and spreading out upon the cropped land. It thus contains the water required for plant growth, together with the spreading or application losses and the losses contingent to storage of moisture in soils prior to being absorbed by the plant roots. The "Gross Duty" is this same quantity of water in lake or flowing stream, reservoir or place of storage, together with the conveyance losses incident to its flow from point of first diversion from its natural source, along the canals and through the channels and conduits to its point of entry on to the cropped soil. "Net Duty" of water is best adapted to considerations of requirements of accessory water supplies and in comparing the needs of different localities. "Gross Duty" is a subject of consideration in canal and conduit design and initial diversion quantities.

The net duty of water may be studied through the amounts of water actually used in irrigation practice and the circumstances contingent to its use. The use of water on different fields varies widely even for like crops, for not only do the quantities that are dissipated in the process of irrigation change greatly with contingent circumstances, but the actual quantity necessary for absorption by the root system of the plant is also conditional. These circumstances and conditions that necessitate the application of more or less accessory water, are so vast in number, changing with every variation of soil, crop and preparation for spreading water, that on small tracts the effect of one may predominate, but on greater areas they tend to neutralize in effect. For this reason the average use of water on very large areas approaches like figures, while the use on small tracts has wide numerical departures from the average. The larger the areas compared, usually the closer agreement in the records of use.

CHAPTER IV.

MONTHLY IRRIGATION DEMAND.

Agricultural plants are able to exist and propagate their species in extremely adverse surroundings, and when deprivation and adversity are their destiny, devote their reserve capacity and utilize their resourcefulness to the utmost in the maintenance of life and the perpetuation of their kind. Moisture, most essential of plant foods, is necessary in large quantities that the environment be auspicious, and when denied the plant, its surroundings are ill-favored to its continued well-being, vegetable growth is slow and stunted, and fruits are dwarfed in size and scant in number. From the plant seed awaiting moisture and favorable temperature to germinate and send forth its first tiny tendrils, to the sturdy mature plant entering harvest stage loaded with plentiful fruits, plant life is most responsive to adequate moisture properly applied. Too much moisture, too long continued, excludes air from the pores of the soil and plant life requiring this air, together with the moisture, is impeded in its growth. Inadequate moisture or long-continued drought are equally unfavorable, for the plant is required to conserve its resources that it may even continue to exist, and this is done at the expense of growth and greater yield. It is the yield, the production of fruits in great number and excellence, that is first affected by moisture supply undesirable in amount or not fittingly distributed. Since all plants of agricultural type are without capacity to store moisture within their structure for use during periods of short supply, their reaction to adversity requires, and the economics of agriculture demand, that favorable conditions of soil moisture be maintained throughout the growing season.

The periodic application of accessory water is therefore essential and the demand for irrigation water follows closely upon the prevalence of the seasonal temperatures of appropriate warmth, favorable to the growth of plants. The moisture in the soil from the winter rains is usually not retained in sufficient quantities to make conditions propitious for vegetable growth long after the growing season opens. The spring rains, when they occur, are seldom adequate in amount to much more than wet the ground surface. Such moisture is available principally for shallow rooted plants and only in the requisite abundance during the rather brief period preceding the drying of the ground surface that occurs through evaporation.

In general, the demand for irrigation water increases as the season progresses and temperatures become higher. Water requirements usually reach their peak in midsummer, during the months of July and August, when the temperatures are greatest and the dissipation of the accessory supply, through evaporation and percolation, is a maximum. As the season further progresses and temperatures become lower, the demand usually becomes less and ceases altogether with the termination of the growing season. The crops grown in any locality

influence the distribution of the demand for irrigation waters through the season, affecting the frequency with which exactions are made upon the accessory supply and the amounts demanded, and these water-needs give characteristic variations from these general considerations. According to their developed habits, agricultural plants spring from the dormant life of the winter period or evolve from the latent life of the seed, starting from quiescence at various times during the advancing and unfolding of the growth-stimulating weather of the summer season. The time required to mature the plant from the instant life first stirs in the seedling, or from the initial appearance of vitality in the dormant rooted-plant, to harvest laden stage, differs with the many crops from about sixty days, to the entire growing season. As a consequence, the demand for irrigation water varies with the needs of different crops that are grown. In extensive agricultural districts the proportional areas planted to crops of the several kinds may differ and water requirements be affected likewise.

Due to the variable stream flow that occurs during the season, irrigation use of the past has conformed to a considerable extent with the availability of water in the streams. During the spring, while the supply in the stream channels is ample, an excessive amount of water has often been applied to the cropped land in anticipation of the shortage to come in the latter part of the season. With a short supply in the latter part of the season, the past use has been generally less than the desirable amount. The distribution of the use of irrigation water, in both frequency and amount, as recorded in the measurements on various systems, does not always, therefore, represent the demand under conditions of a favorable supply.

CHAPTER V.

IRRIGATION REQUIREMENTS OF AGRICULTURAL LANDS.

The quantity of water adequate for supporting a growing crop to an harvestable maturity, intrinsically a variable, small in the amount actually incorporated into the plant structure and its products, large in the amount dissipated in supplying the plant needs, may best be derived from the results of experience and practice. California's agricultural lands, deficient in natural moisture, and requiring the application of accessory water through irrigation to produce the luxuriant growth and abundance of fruit which their propitious climate and responsive soil make possible, have received varying quantities of water. The amount applied on the sundry tracts in the various localities, differs widely with all the circumstances and conditions affecting the use of water. From the average use of water obtaining over large areas, sufficiently great to suppress the predominance of effects peculiar to small parcels; natural divisions of the state, sixteen in number, were evolved, called duty of water sections. These sections comprise within their boundaries lands of approximately like geographical position, similar surface conformation, of analogous economic environment, and equal climate, and they form convenient segregations for the disclosure of the irrigation requirements of California's agricultural lands. Delineated on Plate V,¹ the section boundaries show as red lines following natural dividing conformations, and the agricultural lands show as light green areas within the delimiting red lines. Letters within circles, shown interspersed throughout the green areas on the map, give the location of individual irrigation systems or of divers tracts of land for which data have been collected on actual use of water and on proposed uses. A searching inquiry covering the accumulated records of California's use of water has been completed. Comprehensively planned, it includes all procurable measurements, and, containing a preponderance of information, it results in practical values on the irrigation requirements of California's agricultural lands. These accumulated records are the summation of the labors of innumerable engineers and hydrographers, and cover the major portion of the past two decades. The water measurements, both net and gross, were taken over an area that equals more than half the lands irrigated in the State of California in 1919. The records of monthly use of the yearly supply apply to an equally great area of land and for an interval of time that is equivalent to a consecutive period of over five years.

The net amount of water applied on an average area of 2,210,000 acres of land for an average of three and eighth-tenths years, supplemented by one and nine-tenths years of record on ten systems of indeterminate acreage, has been assembled in Table 8, "Use of Water as Measured on Various Systems," together with the crops grown and the distribution of the water used through the months of the year. Also included in Table 8, are one hundred sixty-nine proposals on net use of water for one hundred and nine projects scattered over the state.

¹"Map of Agricultural Areas and Duty of Water Sections."

The monthly use of water comprises the records obtained on an average area of 2,660,000 acres for an average of five and six-tenths years, plus two and four-tenths years of record on forty-six systems of indeterminate acreage, and fifty proposals covering twenty-eight projects.

The gross use of water on California's agricultural lands are the records of an average area of 2,690,000 acres for an average of seven and one-half years, together with two and one-tenth years of record on ten systems of an indeterminate acreage, and supplemented by one hundred and nine proposals for seventy-six projects.

The tracts of land on areas within irrigation systems for which measurements were obtained, are arranged in the table in groups as they lie within the confines of the duty of water sections. Each entry in this table is symbolized by a letter which indicates the position occupied on the map by this land within the duty of water section. For convenience of reference, Table 7, "Index by Sections and Key Letters on Map, Plate V, to Systems Listed in Tables 8 and 9 on Use of Water," lists the irrigation systems in the order of the duty of water section and letter symbol of geographic position within the section. Table 6, "Alphabetical Index to Irrigation Systems Listed in Tables 8 and 9 on Use of Water," presents the irrigation systems in the alphabetical order of their name.

The letter symbols of geographic position also appear on Plate VI, "Net Use of Water as Measured and Proposed on Various Systems," on which is graphically presented all the information collected on the net annual use of water. On this plate, arranged by duty of water section and spread in rows, are upright bars, solid black in color, and resting on common base lines. These upwardly drawn bars indicate by their height above the base line, the amount of irrigation water that was spread upon the lands of the system named below the base of the bar. Geographic location is symbolized by the circled letter above the bar, and approximated by the name of a nearby town which is above the rows of bars. The year of the measured use is placed under the base line at the foot of the bar.

The amount of water used is expressed in feet of depth on the land, as though all the water applied during the entire season were accumulated and confined at one time above the surface of the lands irrigated. The upright bars, representing these average depths, by intercepting tan colored lines, drawn cross-wise and parallel to each other, indicate the depths in feet. The bars have varying widths which approximate the area of land watered on the system for which the bar stands. The narrowest bars apply to areas of a thousand acres or less and the widest bars to greater areas, progressing by graded steps to the broadest bar standing for two hundred thousand acres or more. Unless otherwise specified close above the bars, the general crops of the locality were grown on the lands irrigated, and without unusual predominance of any one variety.

Intermingling with the black bars on Plate VI,¹ are similarly disposed bars of a tan color, which are so distinguished to represent proposed uses of water. These proposed uses are the estimates of irrigation engineers whose names are given adjacent to the bars. These estimates have been prepared in reporting on new projects and are

¹"Net Use of Water as Measured and Proposed on Various Systems."

quantities of water believed to be adequate for the maturing of harvestable crops. Reported by engineers after examining and studying the locality, they are determinations of the net volume of accessory waters which need be procured for the lands. These quantities are distinguished from those represented by the black bars in being estimates of water required, rather than measurements of actual use. The data for drawing the tan colored bars were obtained from Table 9, "Use of Water as Proposed for Various Localities," which contains all the information on the use of water, as proposed by various investigators, collected in the statewide search. The indexes to Tables 6¹ and 7² include the entries in Table 9. The data on the proposed use of water may be traced in Table 6¹ by the alphabetical arrangement of the names of the irrigation projects. This proposed use-of-water data may also be located in Table 7² by using the duty of water section number in which the project lies, together with the letter symbol indicating its position within the section. The extensive amount of information collected on the use of water, both measured and proposed, is presented summarized in Table 10, "Summary of Use and Duty of Water by Sixteen Sections of the State," with the average figures tabulated section by section, for the sixteen duty of water sections of the state. That the duty of water for each of the several sections might be derived from this great assemblage of information, an examination of circumstances and close scrutiny of the conditions surrounding the use of water in each section, was made. All information on the surface conformation, types and fertility of soils, crops grown, prevailing climate, the water supply, and all other related subjects pertinent to irrigation requirements, was reviewed and analyzed, together with the measured uses of water, that the water needs of each section might be disclosed through the values found for the duty of water. The values found for this agricultural need of supplementary water, together with the areas³ of farm land enclosed within each section are set down in Table 1, "Agricultural Area and Net Duty of Water in the Sixteen Sections of California, shown on Plate V," and also in Table 10⁴. These values are also indicated in red on the Map, Plate V⁵, near the center of each section. On Plate VI⁶, these duties of water are represented by red cross lines, parallel to and at a height above the base line proportional to the net duties. For comparison with these red lines representing duties of water, dotted black cross-lines are also presented. The black lines are the net average depth of water used on all the land comprised within the systems and for which measurements are tabulated in Table 8⁷. The dotted-tan colored cross lines are the proposed net depth of water, averaged for the land comprised within the systems for which proposals were made. They are tabulated in Table 9⁸.

¹"Alphabetical Index to Irrigation Systems Listed in Tables 8 and 9 on Use of Water."

²"Index by Sections and Key Letters on Map, Plate V, to Systems Listed in Tables 8 and 9 on Use of Water."

³Areas under irrigation in 1920 obtained from survey made by Irrigation Investigations, United States Department of Agriculture, in cooperation with the then State Department of Engineering.

⁴"Summary of Use and Duty of Water by Sixteen Sections of the State."

⁵"Map of Agricultural Areas and Duty of Water Sections."

⁶"Net Use of Water as Measured and Proposed on Various Systems."

⁷"Use of Water as Measured on Various Systems."

⁸"Use of Water as Proposed for Various Localities."

TABLE 1. AGRICULTURAL AREAS AND NET DUTY OF WATER

in sixteen sections of California, shown on Plate V.

Section number.	Description of section.	Agricultural area.	Net duty of water.
		Acres.	Feet depth on land.
1	Los Angeles area, Ventura to Redlands	1,310,000	1.75
2	San Diego area, Mexican boundary to San Jacinto and Yucaipa	984,000	1.25
3	Imperial, Coachella and Palo Verde valleys	1,299,000	3.00
4	Antelope Valley and Mojave River areas	1,107,000	2.00
5	Inyo-Kern, Owens and Mono valleys	657,000	2.50
6	Sierra foothills and rolling plains east and south of San Joaquin Valley floor ..	1,800,000	1.75
7	San Joaquin Valley floor	5,468,000	2.00
8	Western slope of southern San Joaquin Valley	971,000	1.75
9	Santa Barbara, Santa Maria and San Luis Obispo areas	410,000	1.50
10	Salinas and contiguous valleys	296,000	1.75
11	Santa Clara and adjacent valley areas	530,000	1.50
12	Delta lands of San Joaquin and Sacramento valleys	453,000	1.50
13	Sacramento Valley floor	2,694,000	2.25
14	Sierra foothills, and rolling plains east and west of Sacramento Valley floor ..	2,305,000	1.50
15	North coast area .. .	624,000	1.25
16	Northeastern mountain-valley and plateau areas	1,598,000	1.75
	Total	22,506,000	.....

The circumstances and conditions surrounding the use of water in each section through which the duty of water has been found, is set forth section by section in Table 11, "Illustrative Climatological Data for Agricultural Lands by Sixteen Sections of the State," and also in the accompanying summary. This table and summary also contain material and pertinent facts that were of assistance in disclosing the desirable distribution through the year of the annual irrigation supply, for each of the sixteen sections. This desirable distribution, as well as the duty of water, was sought in the measurements of the monthly use of water as found recorded in Table 8¹, and in the proposed monthly use of water on the projects listed in Table 9². The black bars, upwardly drawn from a common base line shown on Plate VII, "Monthly Use of Annual Irrigation Supply," pictures the average portions of the annual supply used in each month of the year, section by section. The height of these black bars, by intercepting the tan colored cross lines, indicate the fractional part used in that month, of the total use for the year. They are expressed in per cent for the successive months and cover the projects for which measurements are noted in Table 8¹. Intermingled with these black bars are tan colored bars also upright, whose height, in likewise intercepting the tan colored cross lines, gives the average of proposed uses of water within the section, in the same terms as the black bars. The values found for the desirable monthly distribution of the annual supply through consideration of these data, is depicted graphically on Plate VII by a red line drawn step by step and from month to month for each of the sixteen sections. This red line, expressed in the same terms as the black and tan bars, mounts to heights above the base, in each succeeding month to indicate by its position, the portion of the annual supply which it is desirable to use in that month. The values found are also printed in Table 2, "Desirable Monthly Distribution of Annual Supply According to Duty of Water in Sixteen Sections of California, shown on Plate V."

The data establishing the average annual net duty of water and the desirable portion to be used each month for the sixteen sections of the state have been largely presented on Plates III to VII, inclusive, and Tables 4 to 11, inclusive. However, there are many considerations of topography, soil, climate, economic and other conditions, which influence these deductions. These considerations are here summarized for each section.

¹"Use of Water as Measured on Various Systems."

²"Use of Water as Proposed for Various Localities."

TABLE 2.

TABLE 2. DESIRABLE MONTHLY DISTRIBUTION OF ANNUAL SUPPLY ACCORDING TO DUTY OF WATER

in sixteen sections of California, shown on Plate V.

Section.	Description of section.	Net duty of water.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
No.		Feet depth on land.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.
1	Los Angeles area, Ventura to Redlands.	1.75	3	3	3	7	12	14	15	14	12	9	5	3
2	San Diego area, Mexican boundary to San Jacinto and Yucaipa.	1.25	2	2	3	7	13	14	15	14	13	10	5	2
3	Imperial, Coachella and Palo Verde valleys.	3.00	3	5	7	8	10	12	13	13	12	9	5	3
4	Antelope Valley and Mojave River areas.	2.00			3	10	16	18	20	18	10	5		
5	Inyo-Kern, Owens and Mono valleys.	2.50			2	10	16	20	20	18	10	4		
6	Sierra foothills and rolling plains east and south of San Joaquin Valley floor.	1.75		1	3	10	16	18	18	16	11	6	1	
7	San Joaquin Valley floor.	2.00		2	5	11	17	18	18	15	10	4		
8	Western slope of southern San Joaquin Valley.	1.75		2	5	11	17	18	18	15	10	4		
9	Santa Barbara, Santa Maria and San Luis Obispo areas.	1.50	2	2	2	5	12	16	20	16	13	8	2	2
10	Salinas and contiguous valleys.	1.75			2	12	18	20	20	16	10	2		
11	Santa Clara and adjacent valley areas.	1.50			4	6	15	20	15	15	14	9	2	
12	Delta lands of San Joaquin and Sacramento valleys.	1.50					8	22	30	25	15			
13	Sacramento Valley floor.	2.25			1	5	16	20	22	20	12	4		
14	Sierra foothills, and rolling plains east and west of Sacramento Valley floor.	1.50			2	2	15	20	22	20	13	5	1	
15	North coast area.	1.25				10	20	20	20	17	11	2		
16	Northeastern mountain-valley and plateau areas.	1.75				3	14	24	26	21	12			

SECTION 1.

LOS ANGELES AREA, VENTURA TO REDLANDS.

Total agricultural area -----1,310,000 acres

Area under irrigation in 1920-- 669,000 acres

Section 1 lies south of Tehachapi Pass and is disposed about the city of Los Angeles, the metropolis of southern California. It is bounded on the west and south by the ocean, and it extends from the Pacific littoral to include agricultural valleys that are situated on the western slope of San Bernardino Range. Almost all of Orange and one-half of Ventura and Los Angeles counties, together with portions of Riverside and San Bernardino counties, are in this section. It comprises the drainage basin of the lower half of the Santa Clara River and most of the area drained by the Ventura, Los Angeles, San Gabriel, and Santa Ana rivers.

This section includes the coastal plains of Ventura, Los Angeles and Orange counties, and the interior valleys of San Fernando, San Gabriel, Pomona, Cucamonga and San Bernardino. The upper margins of these valleys are between elevations of from 1000 to 1500 feet, and this, with the relatively short distance required to arrive at this altitude, gives rise to steep slopes, with the result that the larger portion of the irrigated lands of this section have favorable drainage.

The mountains of the section are of a granitic formation. The subsidiary hills, more dispersed and less elevated, are sedimentary, consisting mainly of shales and conglomerates. The predominant soils, derived from the weathering, attrition, conveyance and deposition of the rock composing these mountains, are, therefore, of granitic origin and may vary from a disintegrated granite near the hills to a sandy loam in the vicinity of the estuaries, while the soils which originate in the shale formations, show a finer texture in which clay and adobe are prominent.

The climate prevailing over the agricultural lands comprised in this section is tempered by the proximity of the Pacific Ocean. Seasonal fluctuations of temperatures are moderate, winter temperatures below freezing are infrequent and of short duration, and on the table lands bordering the coast, frosts are very exceptional. The coastal plains and plateaus are subject to frequent fogs and heavy dew, even during the dry season; the bottom lands of the interior valleys are subject to occasional frosts, but the thermal belt on the foothill lands is practically frost-free. The summer temperatures are highest in August, during which the mean monthly average is 73 degrees for this section, while the lowest temperatures occur in January, for which the mean monthly temperature is 52 degrees. The average seasonal rainfall of the plains and valleys is about fifteen inches, with a minimum of about nine inches and a maximum of over thirty inches.

The active growing season is comprised within the period of March to October; however, on the thermal belt of the foothills, citrus trees have a perennial seasonal growth, and on the plateau lands along the coast, vegetables are raised throughout the year. The culture of citrus trees, deciduous fruits, alfalfa, together with garden produce, are the

principal agricultural enterprises. Market facilities are exceptionally good, the country being interspersed with cities and population centers. Cooperative marketing has also been developed to an effective degree.

The electric lines that are spread throughout this section, together with the branch and feeder lines of two transcontinental railway systems that traverse it, their many stations and sidings, give exceptional opportunity for the transporting of freight shipments. The section is crossed and recrossed by hard surfaced highways, which gives facility for conveyance by motor; and through its ocean harbor, and its docks and wharves with their loading equipment, it has direct access to ocean transport.

The water supplies that have been developed, have not been sufficient to meet the demands of the entire irrigable area. There are, however, large volumes of flood water not yet utilized. In former years the main water supply was derived from the surface streams. These surface waters are not only limited in volume, but also extremely erratic in flow, depending upon seasonal rainfall. The result is a stream flow which rapidly decreases during the summer months. The absence of adequate reservoir sites in both the San Gabriel and San Bernardino ranges, and the existence of ground water basins of large capacity, which are well adapted for water storage, have developed in this region the practice of spreading flood waters over the gravel beds at and below the mouths of the canyons. The spread waters, after penetrating the surface soil, percolate to greater depths and become available for use through pumping from wells. This method of replenishment and retention of the underground storage for deferred use, is finding a more and more extensive application.

All of the main valleys and the entire coastal plain consist of alluvial deposits of great depth, which are suitable for the absorption of flood and rain waters. The past twenty years have seen the development of these ground water sources on an unprecedented scale through the sinking of thousands of wells, some of them to nearly two thousand feet in depth, and the installation of modern pumping equipment, so that today over sixty per cent of the irrigation and domestic supply is derived from subterranean sources. The relatively small cost of the development of individual ground water supplies, has made feasible this type of irrigation supply for small ranches.

Irrigation is necessary throughout this section to secure a crop yield commensurate in value with the price of the land. The amount of irrigation water actually applied to the land varies from six to twelve inches for bean crops and deciduous fruits, to as much as eighteen inches for citrus fruits and thirty inches for alfalfa. The available water has been rather effectively used, and, due to the surface slopes and the soil's texture that gives the favorable drainage prevailing in this section, it has been possible to collect and re-use some waters after their initial application. In localities adjacent to the coast the stored soil-moisture is conserved by the high humidity, and the fogs and mists that occur at certain intervals. Scarcity of water has required the effectual use made of it in this section: a large portion of the acreage brings crops to maturity with a water use of one foot or less.

The mean of the measured net annual use for the entire section is 1.62 feet in depth. This quantity is slightly less than that required

to obtain full crop production. This lesser use of water results, in part, from the smaller demand made by acreages planted to young orchards and by groves which have not reached mature growth. The net duty for this section is therefore 1.75 feet.

The monthly distribution of the accessory water supplies, in per cent of the entire seasonal use, is well indicated by the present and past use on existing irrigation systems. On some of these systems the natural stream flow has been supplemented by storage, and on many projects the available surface waters have been greatly enhanced by the development of underground waters. This regulation and augmentation has resulted in a fairly adequate water supply throughout the irrigation season.

The desirable monthly use in per cent of total seasonal supply, is, therefore:

January -----	3 per cent
February -----	3 per cent
March -----	3 per cent
April -----	7 per cent
May -----	12 per cent
June -----	14 per cent
July -----	15 per cent
August -----	14 per cent
September -----	12 per cent
October -----	9 per cent
November -----	5 per cent
December -----	3 per cent

SECTION 2.

SAN DIEGO AREA, MEXICAN BOUNDARY TO SAN JACINTO AND YUCAIPA.

Total agricultural area -----	984,000 acres
Area under irrigation in 1920----	96,000 acres

This section contains almost all of San Diego County, portions of Riverside, Orange and San Bernardino counties, and comprises within its boundaries, the drainage basins of Sweetwater, San Diego, San Dieguito, San Luis Rey, Santa Margarita and San Jacinto rivers, all of which flow into the Pacific Ocean. It is bounded on the south by Mexico, on the east by the San Jacinto and San Diego mountain ranges, on the northeast by San Bernardino Mountains, and on the west by the Pacific Ocean.

The agricultural lands of this section lie on the coastal plains, on the foothill slopes rising from these plains, and in the foothills and mountain valleys of the San Bernardino. The parcels of farming land adjacent to the coast cover a strip some seventy miles in length, and from twenty to thirty miles wide. The agricultural areas of valley land are located inland a distance of approximately thirty-five miles from the ocean and include the interior valley of the San Jacinto river and the Hemet, Lakeview, Perris, Elsinore and Temecula valleys. The table lands along the coast have a compact, impervious subsoil; the lands of both the coast and interior valleys in many instances have subsoils of dense texture.

The mean annual rainfall ranges from about ten inches for the coastal lands to a maximum of about forty inches in the higher moun-

tain areas. Most of the agricultural lands on which irrigation is now practiced have a mean annual precipitation of less than eighteen inches. The proximity of the ocean has its influence in suppressing the extremes of summer and winter temperature. The seasonal variation of temperature in departing so slightly from the mean, is conducive of long growing season which permits double cropping. The culture of vegetables during the winter months is being more widely practiced. Portions of the coastal area and lower interior valleys are well adapted to citrus culture. The more remote interior valleys have occasional frosts and for this reason are more suitable to the raising of alfalfa and deciduous fruits.

The transportation facilities are the main and branch lines of two transcontinental railroads. Marketing facilities are good along the coast. The principal city, San Diego, situated on a salt water bay, has docks, wharves and freight-transfer equipment and an extensive ocean commerce.

There are no appreciable areas of water-logged lands in this section. The available water supply along the coast is limited. In the coastal valley, surface storage of flood waters is practiced while underground storage is limited by the shallow depth of the alluvial fill. In the interior valleys both surface and ground water storage is utilized. The scarceness of the supply has developed a high standard of irrigation practice and intensive cultivation of the soil. The trend of development is toward small farms of ten to forty acres, although there are still a number of large grants which have not been subdivided.

The use of water is from six inches to two feet. The average measured net annual use is 1.26 feet in depth; it represents past practice and is the mean of sixty-three records for an aggregate area of 321,700 acres. The use has been to some extent limited by the scarcity and high cost of water. These conditions will continue to exist, for the available water supply is small as compared to the total area of agricultural lands. This favors future development taking place along the Pacific coastal plains where the climatic conditions and the adaptable crops favor a small water requirement. As the country becomes more intensively developed, it is probable that the culture of alfalfa will give way to orchards, vegetables and grapes, which require less irrigation water. These considerations disclose that the average net duty for this section is 1.25 feet in depth.

The monthly use of irrigation water in per cent of the total seasonal use, is well indicated by the past use on lands which have been served with a controlled water supply, and is:

January -----	2 per cent
February -----	2 per cent
March -----	3 per cent
April -----	7 per cent
May -----	13 per cent
June -----	14 per cent
July -----	15 per cent
August -----	14 per cent
September -----	13 per cent
October -----	10 per cent
November -----	5 per cent
December -----	2 per cent

SECTION 3.

IMPERIAL, COACHELLA AND PALO VERDE VALLEYS.

Total agricultural area -----1,299,000 acres
Area under irrigation in 1920---- 524,000 acres

This section is located in the southeastern corner of California. It lies east of the San Bernardino Range, is bounded on the south by Mexico, on the east by Arizona, and includes the agricultural lands reclaimed from the Salton Sink, and a strip of bottom and plateau lands that border the Colorado River. It comprises over one-half of Imperial County, and portions of San Bernardino, San Diego and Riverside counties. The principal agricultural areas lie in Imperial, Palo Verde and Coachella valleys.

Imperial Valley, the most extensive body of agricultural land in this section, is in Imperial County between the Salton Sea and the Mexican boundary. This valley is at or below sea level and comprises part of the delta of the Colorado River. The soil varies from a very fine, sandy loam to a hard clay. The region has practically no rainfall and is entirely without local water supply.

Palo Verde Valley is located along the western bank of the Colorado River and is the most easterly of the three principal agricultural valleys in Section 3. This valley lies partly in Riverside and partly in Imperial County. The soils of the bottom lands which are contiguous to the Colorado River, are exclusively the deposit of this river and are lighter and more easily tilled than some of the Imperial Valley soils. The Palo Verde table lands, which are located in the western portion of the valley away from the river and above the bottom lands, are of a different formation, and have their origin in the Chuckawalla Ranges.

Coachella Valley, in Riverside County, is located northwest from Imperial Valley and west of the Palo Verde Valley and extends from the vicinity of Palm Springs east of San Geronio Pass, at an elevation of about 1200 feet, to the Salton Sea on the south, which is 250 feet below sea level. This valley has been built up by the deposits of the Whitewater River and its tributaries, which originate in the granitic formations of the San Jacinto Mountains to the northwest and San Bernardino Mountains to the north, although some of the minor tributaries find their origin in the clay hills which border the valley along the northeast boundary.

Because of the low elevation of the farming lands of both the Imperial Valley and Palo Verde Valley relative to the Colorado River, which forms the only possible water exit for these areas, the natural drainage is defective. Much water-logging of agricultural land has already taken place. Extensive drainage works are under construction that these conditions may be remedied. Coachella Valley, with its sandy soil and subsoil, has very favorable drainage conditions. The great depth to ground water in this valley is, in part, the result of withdrawal of ground waters through pumping. There are, however, bottom lands in the Coachella Valley, near the Salton Sea, where the drainage is not so satisfactory, and the ground waters are close to the surface of the soil.

The winters in these valleys are mild throughout the day, but night temperatures are low and frosts occur occasionally during the months of December, January and part of February. There is, however, a markedly higher prevailing winter temperature over the high table lands which girdle the valleys of the Imperial and Palo Verde. This higher temperature is found also in the sandhill regions and the foothills of the Coachella Valley. The summers are long and hot. The humidity is very low, especially during the summer months. The main agricultural areas of this section have a negligible rainfall, the mean precipitation being less than four inches; however, the snowcapped mountains of the San Jacinto and San Bernardino on the north and northwest, receive a seasonal, though irregular precipitation on their desert slopes. These rainfalls are of high intensity, but of short duration, and are of a type that produces an extremely erratic run-off.

The growing season extends practically throughout the year, though some agricultural plants are more or less dormant during the months of December and January. The standard crops are alfalfa, corn, grain, cotton, melons, vegetables and grapes, with some citrus and deciduous fruits. The date industry has become prominent in Coachella Valley and in the northern part of the Imperial Valley. Coachella Valley and Palo Verde Valley are each served by one transcontinental railroad. Imperial Valley has one transcontinental line, besides several branch and feeder lines, and all three districts are well situated as to marketing centers and freight shipping points. There are numerous pre-cooling plants and vegetable and fruit storage plants which are adequately equipped for the icing of transcontinental refrigerator trains that take on their loads of agricultural products in this district.

In Imperial and Palo Verde valleys, farming is at present conducted on comparatively large units of land, that is, 160 to 320 acres and more in extent. The subdividing of these large units into smaller tracts has been in progress as crops, other than alfalfa, grain or cotton, are raised.

In the Coachella Valley small ranches and intensive cultivation are the rule. The available water supply is pumped from wells or is derived from artesian flow, and is limited. It is, however, feasible to supply the Coachella Valley from the Colorado River, and this source of water supply is under investigation by the United States Reclamation Service. Both Palo Verde and Imperial Valley receive their water supply from the Colorado River, although this sometimes drops below the flow required to satisfy the demand during the month of September.

Water is being less wastefully used as farming methods improve, particularly in Imperial Valley and Palo Verde Valley, while in Coachella Valley the scant supply tends toward an economical use of water. The soil of the Coachella Valley is unusually porous and has free underground drainage, so that the quantities used are greater than in the other valleys. The average use of water on the land in Imperial Valley and Palo Verde Valley, is in the neighborhood of 2.5 to 3 feet in depth, while in Coachella Valley the average use, on small areas of sandy soils with free underground drainage, has been nearly five feet in depth. The average net annual use which represents past practice is 2.91 feet. This is the mean of 51 records, equivalent to one year's measurements on 2,588,000 acres.

Because of the deficiency in the water supply during the late summer and early fall months of some years, the use has been less than that which would obtain with an ample supply for the entire season; on the other hand with abundant water in the early summer months, greater amounts have been used than were needed. The average net duty for this section is, therefore, 3.0 feet in depth.

Modified to improve the late summer deficiency, the past use in Imperial Valley and the use obtaining close at hand on the Salt River and Yuma projects in Arizona, disclose that the desirable average monthly use in per cent of the total seasonal supply is:

January -----	3 per cent
February -----	5 per cent
March -----	7 per cent
April -----	8 per cent
May -----	10 per cent
June -----	12 per cent
July -----	13 per cent
August -----	13 per cent
September -----	12 per cent
October -----	9 per cent
November -----	5 per cent
December -----	3 per cent

SECTION 4.

ANTELOPE VALLEY AND MOJAVE RIVER AREA.

Total agricultural area-----	1,107,000 acres
Area under irrigation in 1920----	22,000 acres

This section is south of the Sierra Nevadas, east of the Tehachapi Pass and north of the San Bernardino Mountains, and comprises portions of Kern, San Bernardino and Los Angeles counties. The irrigable agricultural lands lie in Antelope and Victor valleys in the western portion of the Mojave Desert. These lands are located at the general altitude of 3000 feet. The most fertile sections are the northern slopes of the mountains which have a soil of disintegrated granite, while the bottom lands show heavier soils sometimes impregnated with alkali.

The climatic characteristics are high temperatures throughout a large part of the year, a long hot summer, winters with occasional frosts and severe wind storms, a low humidity, and a very meager rainfall. The northern slopes of the San Bernardino and San Gabriel mountains receive seasonal rains. The daily range of temperature is very great.

Agriculture is impossible without irrigation. There are but few continuously flowing streams in or near the agricultural areas, but subterranean waters are procurable from wells, in limited quantities. Only about two per cent of the agricultural area is irrigated. Of this, less than one-third is supplied by gravity water, the remainder receiving its accessory supply through draft on the ground waters underlying the agricultural lands.

Antelope Valley in the western portion and Victor Valley in the southern portion of this section, produce alfalfa and deciduous fruits

such as pears, apricots, almonds and apples. The marketing facilities are adequate, the district being traversed by the main line of a railroad.

The severity of the desert climate and the deficient water supply have put natural limitations on the development of this section, and large areas will undoubtedly remain uncultivated for the want of irrigation water. The measured average net annual use is 1.39 feet. This is the mean of records for the equivalent of one season's measurements on an area of 6,500 acres. A considerably larger quantity of water is required for full production of general crops, but the available water supply is very limited so that undoubtedly, crops requiring the least irrigation water will be grown. From these considerations the average net duty is disclosed as 2.0 feet in depth.

The average monthly use in per cent of the total seasonal supply is revealed from the consideration of the growing period, monthly temperatures, precipitation, probable crops to be grown and a comparison with the use in other localities, and is:

January -----	0 per cent
February -----	0 per cent
March -----	3 per cent
April -----	10 per cent
May -----	16 per cent
June -----	18 per cent
July -----	20 per cent
August -----	18 per cent
September -----	10 per cent
October -----	5 per cent
November -----	0 per cent
December -----	0 per cent

SECTION 5.

INYO-KERN, OWENS AND MONO VALLEYS.

Total agricultural area-----	657,000 acres
Area under irrigation in 1920---	136,000 acres

This section lies east of the crest of the Sierra Nevada Mountains, south of Lake Tahoe, and comprises all of Alpine and Mono counties and portions of Inyo County. The section extends from the north end of Alpine County to the southern boundary of Inyo-Kern Valley in Kern County, an approximate distance of 225 miles. The principal agricultural areas are located in the valleys of Walker River and Mono Lake, in Mono County, in the various subdivisions of Owens Valley, and in Inyo-Kern Valley. The altitude varies from about 2500 feet in Inyo-Kern Valley to 6500 feet in the East Walker area. The average annual precipitation is less than seven inches. There is in the higher valleys a well-defined winter season. Stock raising and the growing of stock feed to supplement the native grass on the range, constitute the chief agricultural pursuit. The irrigable areas in the northern part of this long narrow section are to be found on the tributaries of streams flowing into Nevada, thus, in Alpine County, several thousand acres are irrigated from the west and east forks of Carson River, and in the Antelope and Bridgeport regions, a much larger area is watered by the tributaries of Walker River. Mono Lake, at an elevation of 6400 feet

and having an area of 54,000 acres, is fed chiefly by streams flowing from the eastern slope of the Sierra Nevadas. The lake has no outlet, but loses its water by evaporation.

Owens Valley is located in Inyo and Mono counties and embraces a strip of agricultural land of from two to six miles in width and 120 miles in length. The average elevation is 4000 feet. The mean monthly winter temperature drops as low as 35 degrees during the months of November to March, and frosts are frequent. The summers are hot and dry and the growing season extends from April to October, during which irrigation is practiced. Owens Valley receives an average seasonal precipitation of less than six inches, while a fairly abundant rain and snowfall occurs on the eastern slope of the Sierras and furnishes a water supply for both Mono and Owens valleys which is in excess of their needs. The mountain ranges to the east of Owens Valley receive but scant seasonal rainfall, and this does not contribute materially to the water supply of the valley. The side slopes of the valley are steep and the soil, which is a disintegrated granite with extensive lava beds, is generally porous and conducive to large seepage losses. The bottom lands of Owens Valley are deficient in drainage. Here are large grass areas and alkali flats that are not irrigated. These are recipient of much of the drainage water coming from irrigation on the more elevated land. These flats evaporate considerable amounts of water, so that under present conditions only a part of the drainage waters are available for re-use.

Inyo-Kern Valley occupies the southern part of this section and has an average elevation of 2500 feet. The climate has all the characteristics of the desert, with a hot and dry summer and occasional frosts in winter, but the elevation of the valley accentuates the cold of the winter nights so that the growing season is not perennial. The tributary drainage area is deficient in water production, so that large portions of this valley have no irrigation possibilities, unless it be by importation of a supply from other districts. A small amount of ground water is being developed from wells at the present time.

The slopes rising from the floors of these valleys, which are well drained and have a sandy soil, offer the best farming possibilities. Alfalfa and deciduous fruits are raised, the latter being probably the more dominant crop on account of the lack of an adequate water supply.

Mono Valley is without railroad transportation, it maintaining communication through highways alone. The Owens and Inyo-Kern valleys are served by a branch line of one of the transcontinental railroads.

The average measured net annual use of irrigation water in this section is 3.31 feet. Wherever water is readily obtainable, a liberal use has been the prevailing practice. This excessive use of water, resulting from the crude and wasteful methods of irrigation, has resulted in much water-logging of agricultural lands and the accumulation of alkali salts to a damaging extent, over large areas. The subdivision of the larger holdings, the growing of more diversified crops, the improvement of canal systems and the more skillful application of water, should bring about, in time, a more careful use of water as it has in

other sections of the state and, in anticipation of modifications to the present practices similar to those which have elsewhere occurred, the data discloses the annual net duty to be 2.5 feet in depth.

As a rule, little water is used for irrigation before the first of April, or after the last of September. The desirable monthly distribution of the annual supply during the irrigation period, expressed in per cent of the total seasonal use, has been derived from the records of past use, modified slightly to conform with conditions were there a fully regulated water supply, instead of the natural stream flow, which is low during the late summer months. It is as follows:

January -----	0 per cent
February -----	0 per cent
March -----	2 per cent
April -----	10 per cent
May -----	16 per cent
June -----	20 per cent
July -----	20 per cent
August -----	18 per cent
September -----	10 per cent
October -----	4 per cent
November -----	0 per cent
December -----	0 per cent

SECTION 6.

SIERRA FOOTHILLS AND ROLLING PLAINS EAST AND SOUTH OF SAN JOAQUIN VALLEY FLOOR.

Total agricultural area-----1,800,000 acres
Area under irrigation in 1920--- 77,200 acres

This section extends from the Mokelumne River to the Tehachapi Pass, thence around the south end of the San Joaquin Valley to a line opposite Buena Vista Lake and includes portions of the San Joaquin, Calaveras, Stanislaus, Tuolumne, Merced, Mariposa, Madera, Fresno, Tulare and Kern counties. It includes all the agricultural lands above the floor of the San Joaquin Valley on the western slope of the Sierra Nevada Mountains and on the northern slope of the Tehachapi. The agricultural lands of the section are situated in the small valleys on these slopes and on the foothills and rolling plains, and areas between the flat floor of the valley and the mountains proper.

The surface conformation of the agricultural area in this section, ranges from the gentle slopes along the foothills, which merge into the valley floor, to the steeper slopes and irregularly broken and scattered parcels at the higher elevations. The land rises rapidly and with increasingly steep gradients, as it recedes from the floor of the valley, and some of the agricultural land attains a maximum elevation of from 2500 to 3000 feet.

The soils along the foothill slopes are generally loams and gravelly loams underlaid at varying depths with compact subsoils or hardpan, and heavier soils. The soils of the higher lands have been mainly formed from the weathering of granitic rocks. They are micaceous, usually friable, and commonly underlaid with more compact and less permeable

subsoils. At widely varying depths, but usually less than six feet, the subsoil passes into partially disintegrated granite which frequently continues for several feet before reaching the unaltered rock. The surface drainage is good and the lands of this section are free from alkali.

While the winters are cold and the precipitation relatively large over the higher mountain areas, the climatic conditions on the lower part of the area are similar to those of the valley floor. The summer temperatures decrease slightly as the higher elevations are reached, but in general the irrigation season has its beginning later in the spring months. The present irrigated area in this section is only a small part of the total area of agricultural lands. The irrigated crops are principally deciduous and citrus fruits, vines, and alfalfa. The thermal belt, extending along the foothills and below an elevation of 1200 feet, gives a large area that is adapted to the raising of citrus fruits. Alfalfa is mostly limited to the lower plains and to some of the flatter lands located in the smaller valleys in the hills.

Good railroad transportation facilities are afforded the regions along the lower edge of this section by two transcontinental lines. Branches of these lines, and electric railroads extend into the more developed hill area of this section, however, much of the higher lands of Section 6 require a long haul to reach shipping points on the railroads.

Of the lands bordering the valley, the favorable gradients of the surface slope, and their elevation above the floor of the valley and above the bottom of the stream beds that traverse this area, give it a good drainage.

The water supply is dependent principally on streams and rivers that have their origin in the high Sierras, and which flow through this area to the San Joaquin Valley floor below. As much of the normal flow, and practically all of the late summer and autumn flow, is already utilized, the development of irrigation water for the rest of this section is dependent on the storage of flood waters and on a limited amount of ground water. For this reason, as well as the irregular surface contour, the cost of irrigation development will necessarily be high for most of the area.

The agricultural growth of this section indicates that the future development will be principally in the intensive farming of the higher priced irrigated crops. The large area included in the thermal belt will make citrus fruits an important crop, also. It is anticipated that deciduous orchards and vineyards, with some alfalfa and miscellaneous crops, will comprise the remainder of the products grown on the irrigated area.

The net use of water for citrus land ranges from 1.5 to 2 feet; the average net annual use obtained on the Lindsay-Strathmore and Terra Bella irrigation districts, where citrus crops predominate, is about 1.5 feet in depth, although the use on these districts has been limited by the scarcity of water. The use for the other crops will be somewhat less than on the floor of the valley, because alfalfa will naturally be a minor crop and conditions will demand a careful use of water. These considerations reveal that the average annual net duty for this section is 1.75 feet in depth.

The monthly use of water in the past on the Lindsay and Terra Bella districts, is of value in determining the ultimate monthly use for lands devoted principally to citrus fruits. For other crops the monthly use determined for the San Joaquin Valley floor, is more representative. The desirable monthly distribution, in per cent of the total seasonal use for this section, determined from these data is:

January -----	0 per cent
February -----	1 per cent
March -----	3 per cent
April -----	10 per cent
May -----	16 per cent
June -----	18 per cent
July -----	18 per cent
August -----	16 per cent
September -----	11 per cent
October -----	6 per cent
November -----	1 per cent
December -----	0 per cent

SECTION 7.

SAN JOAQUIN VALLEY FLOOR.

Total agricultural area-----5,468,000 acres

Area under irrigation in 1920---2,712,000 acres

Section 7 comprises about two-thirds of the total agricultural area of the great central valley, and consequently 25 per cent of the total agricultural lands of California. It contains the largest irrigated district of the state. Broadly speaking, it includes that portion of the great valley that lies between the Sierra Nevada and Coast Range mountains, from the Tehachapi Pass on the south to Cosumnes River and the lower delta lands of Suisun Bay on the north. The alluvial fan of Kings River forms a low ridge which separates the Tulare Basin, or the southerly portion, from the remainder of the valley. Portions of Contra Costa, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern counties are included in this section.

Kings River, during flood stage, flows in part through Fresno Slough into San Joaquin River, and in part into Tulare Basin. The other main streams entering the Tulare Basin are the Kern, Tule and Kaweah rivers. The drainage basins of these streams extend into the high Sierras and, during years of more than normal flow, their flood waters reach Tulare Lake. Through evaporation and non-replenishment from flood waters in all seasons, a large part of the bed of Tulare Lake periodically becomes dry, and is put under cultivation. Levees have been built to restrict the flooded area of this lake bed. With the extension of irrigation and the development of storage of flood waters, the frequency and extent of overflow will be reduced. Kern River discharges into Buena Vista Lake, which has been converted into a storage reservoir by the construction of earth embankments, and now, only during exceptional flood years, do surplus flood waters reach Tulare Lake from this river.

Upper San Joaquin River is the first important stream north of the Kings River ridge. The San Joaquin rises in the high Sierras and flows

down the westerly slope of this range in a southwesterly direction until it reaches the trough of the valley, where it turns and flows along the trough in a northwesterly direction to Suisun Bay. The main tributaries of the San Joaquin River in order from south to north, are: Merced, Tuolumne, Stanislaus, Calaveras and Mokelumne rivers. All their drainage areas, except the Calaveras, extend into the high Sierras. The maximum flood flows occur during the mid-winter months and result from excessive rainfall, but are of short duration. The more continuous flood flows are produced by melting snows, and these occur during the months of May and June. The stream flow then diminishes rapidly and is small during the late summer and autumn months.

The smaller streams draining into the San Joaquin Valley, whose drainage basins do not reach into the high mountains, are fed largely by rain water; they are intermittent and more torrential in character. The streams that have their watersheds on the east slope of the Coast Range, are of less importance, since the precipitation on this slope is small, and the run-off is subject to wide fluctuations with little or no dependable flow during dry years.

A strip of low lands along the trough of the San Joaquin Valley and extending from the mouth of Upper San Joaquin River near Kings River ridge, to about the mouth of the Stanislaus, being in width from about one to twelve miles, is below the high water level reached during the maximum floods. These lands are, in part, reclaimed and protected from overflow by levees. Below the mouth of the Stanislaus, is the San Joaquin delta proper which merges with the delta of the Sacramento and Mokelumne rivers.

The lands in this section range from 450 feet above sea level at the southerly end, to slightly above sea level for the lands adjacent to the delta region in the north. The average longitudinal slope of the floor of the valley, from the Kings River ridge on the south, to the mouth of the Stanislaus on the north, is about two feet to the mile. The transverse slope towards the trough of the valley, increases from less than five feet to a mile for some of the flattened or basin-like surfaces in the lower parts of the valley adjacent to the trough, to from five to ten feet per mile for the main body of the land on either side of the valley, and from ten to forty feet per mile for the lands near the foothills. In general, the slopes on the eastern side of the valley are somewhat flatter than those on the western side. The favorable slope and smoothness of the surface make the cost of construction of distribution ditches and the preparation of lands for irrigation, relatively low; on the other hand, this advantage is offset on flat slopes toward and along the trough of the valley, coincident with the low elevation and the decreasing depth of the river and creek channels as they reach the trough, by poor drainage conditions and limit the amount of surplus irrigation water which can enter the soil and be carried away through natural underground drainage and require the construction of drainage canals.

The valley floor is the result of the filling from unknown depths, of material washed down from the enclosing mountains and distributed across land surfaces as alluvial fan material. There is considerable variation in the texture and other properties of the soil and subsoil, not

only in areas far apart, but also in adjacent small areas. In general, the soils of the land on the east side of the valley and north of Kings River, vary from coarse, sandy loams to clay loams with medium sandy loams predominating. The soils are generally underlaid with compact subsoils and in some cases with more or less continuously indurated or hardpan layers. The hardpan varies from a few inches to one or more feet in thickness and is found at depths that range from near the surface to six feet or more. This presence of compact subsoil or hardpan under most of the coarse, sandy soil, permits the irrigation of these soils without an excessive use of water. The soils on the east side of the valley, south of the Kings River, are generally sandy loams, loams and clay loams, but not underlaid by hardpan; they are retentive of moisture and are productive under sparing applications of water.

The soils on the entire western side of the San Joaquin Valley, are generally more compact in texture and retentive of moisture than the soils on the east side, and consist principally of loams and clay loams.

Alkali lands occur in scattered spots or streaks of a few acres in extent, to bodies of land that include several thousand acres or more. North of the Kings River ridge, alkali areas are confined largely to the flatter slopes and the basins lying adjacent to and along the trough of the valley. South of the Kings River ridge and in the Tulare Basin, there is a belt of alkali-free land averaging several miles in width and extending along the lowest part of the valley from Tulare Lake on the south, to the ridge on the north. This strip is bordered on the west by a continuous body of alkali soils varying in width from less than one mile to six or seven miles. This one continuous body of alkali soil comprises practically all of the alkali lands on the west side. On the east side of the Tulare Basin, excepting for this belt, the alkali soils are largely confined to the flatter slopes and to scattered bodies of land where high water table conditions exist. The steeper slopes near the foothills are usually free from alkali. While some of the alkali lands were formed by the accumulation of alkali salts through natural processes and prior to the initiation of irrigation, the area of alkali lands has been increased in extent through the rise of the groundwater level and resulting concentration of alkali salts near the surface of the soil. This has come about through the application of irrigation waters to adjacent lands and inadequate drainage for the removal of the deeper percolating water from these applications.

The main characteristics of the climate of the San Joaquin Valley are warm, dry summers and moderate winters. The temperatures increase and the rainfall decreases from north to south. There is a long, dry season almost without rain, extending from May to September. During the period from June to September, inclusive, there is a mean rainfall of less than one-half inch. The mean annual rainfall ranges from about five inches in the south to about fifteen inches in the north.

The mean annual temperature ranges from 60 degrees to 65 degrees, with the mean monthly temperature having a variation between 46 degrees in January, and about 81 degrees in July. Minimum temperatures of 20 degrees and maximums of 115 degrees are occasionally attained. The sun during the summer months, shines about 95 per cent of the hours between sunrise and sunset. The growing season is long;

the average frost-free period extends from about March 1st to the middle of November, though killing frosts have occurred as late as the middle of April and as early as the first week in November. The prevailing winds are from the northwest; they attain their highest average velocity in May and June, being reported at Fresno as 10.0 and 9.3 miles per hour for these months, respectively.

Transportation facilities are good throughout the valley, there being over 1400 miles of railroad tracks, not including sidings and spurs. Two transcontinental lines which traverse the entire length of the valley, with their branches, serve a large portion of this area.

The production of dry-farm grain, which has been an extensive pursuit in the valley, has become of less importance through the extension of irrigation. Grain is now grown with irrigation where the rainfall is deficient and not dependable, to rotate with crops, or in double cropping when it is followed by a second crop of corn or beans. Alfalfa is an important irrigated crop, especially during the early years of development of an irrigation project. In the Modesto District, the area in alfalfa reached a maximum of 87 per cent of the total area in crops for the year 1911, but decreased to 40 per cent of the total for the year 1921. In the Turlock District, the percentage decreased from a maximum of 73 per cent in 1914, to 31 per cent in 1921. Alfalfa is an important crop on the west side of the San Joaquin Valley and on lands that are irrigated with the waters of Kern River. On the other hand, it is a less important crop on lands supplied with waters from Kings River. The available data indicate that with an ample supply throughout the season, the area in alfalfa pastures on different projects would range from 20 to 50 per cent of the cropped area and will average about 35 per cent for the entire valley.

The vineyards and deciduous orchards are of growing importance, and are gradually being planted on areas that have been previously devoted to alfalfa and general field crops. In the Fresno Irrigation District, the area in grapes and deciduous orchards is 55 per cent of the gross area planted to crops, but on later projects, such as the Modesto District, the percentage is 20, while on the Turlock District, it is 12 per cent. The available data indicate, that with an adequate irrigation supply, the area in orchard or vines on different projects will range from 10 to 60 per cent and will average 30 per cent for the entire San Joaquin Valley. Sorghum, corn, sugar-beets, melons, beans and other minor crops are successfully grown in the San Joaquin Valley, and will make up the remainder, or 35 per cent of the irrigated crop-area.

The water supply for irrigation use in the San Joaquin Valley has been in the past, largely a diversion of the direct stream flow, unregulated by storage and receiving but small increments of water from underground sources. The marked features of the stream flow are large flood flows during the months of May and June, with a rapidly decreasing flow during July, and with very small flows for the remainder of the irrigation season. This results in an abundant supply during the early months of the irrigation season, which may extend into July during wet years, but a deficient supply in the later

summer months. Because of the uncertainty of the duration of the water supply, and the resulting attempt to store water in the soil for use later in the season, excessive amounts of irrigation water have been applied to the land during the early months of the irrigation period. With an ample supply throughout the season, a better distribution and less wasteful use of water will result.

The underground water is an important source of irrigation supply. It occurs extensively and can be economically developed through pumping from wells. These underground waters have their source in the seepage from the rivers and irrigation canals, and from the surplus irrigation waters applied to the land, which pass down through the soil beyond the reach of the plant roots. Where the supply is unreplenished, as in those areas toward the foothills on the west side, the quantity of underground water is deficient in amount, or can not be economically lifted to the ground surface. The development of underground water as a source of irrigation supply, has been very rapid. In 1909, the area irrigated from underground water was 91,000 acres; it increased to 171,800 acres in 1912, and to over 400,000 acres in 1920. In some areas the annual withdrawal of water has approached, if not actually exceeded, the replenishment.

Prior to irrigation, the groundwater table under the lands not irrigated was at a considerable depth below the earth's surface. In some of the first wells near Fresno, the depth to the water surface was sixty-five feet. The depth to water in a number of wells in the Modesto Irrigation District for the year 1904, which was the first year of irrigation, ranged from 12 feet to 78 feet below the ground surface. During the early years of an irrigation project, before a large portion of the area is irrigated, because of the abundant supply, water is used rather promiscuously and quantities of water are applied to the land far greater than the soil can retain, or the plant growth utilize. On the Modesto District, the volume of water diverted from the Tuolumne River per season, during the first four years, averaged about 10 feet in depth over the land irrigated. Occurrences similar to this have been experienced on nearly all large irrigation projects. Surplus water applied to the land, together with the seepage losses from canals, moves downward through the earth until they reach and unite with the groundwater. When the increment added to the groundwater is greater than the quantities subtracted from it, the water table rises, and on occasions reaches so near the surface that large acreages suffer from an excessively high water table, with, in many cases, a gradual accumulation of alkali salts at the surface of the ground. With the added increments exceeding the subtractions, the water table continues its rise until the evaporation loss from the water-logged lands, together with the underground drainage, equals the surplus irrigation water applied and then a condition of equilibrium is reached.

On one large area of the San Joaquin Valley, 66 per cent of the territory had a water table within four feet of the surface for a period of one month. On another large tract elsewhere in the San Joaquin Valley, over 30 per cent of the area had a water table within four feet of the ground surface for a period of three months. On two irrigation

districts, the water table has been within six feet of the surface for a period of one month; more than 40 per cent of the area of one district and over 60 per cent of the area in the other district, was so affected. On many large bodies of land receiving gravity irrigation water, and where the groundwater table is within the zone of plant roots, the water table seasonal fluctuation is from three to five feet. It rises rapidly after the beginning of the irrigation season, attains its maximum in June and July, and then recedes. The result of this fluctuation is that the deeper root system is drowned out with their submergence by the rising water table and the occurrence as a whole is disastrous to plant growth.

The water-logging results from the surplus irrigation water being greater in amount than can be carried away by the underground drainage. To remedy or ameliorate the water-logged condition, the lining of canals to prevent seepage, and artificial drainage, have been resorted to on a number of projects. The lowering of the water table by pumping from the groundwater is now being successfully carried out in some parts of the valley. This practice not only drains the land, but also recovers water which is available for second use. This recovery of underground water by pumping from wells, the lining of those canals that suffer excessive losses, the more economical use of irrigation water will, to a large extent, prevent water-logging and will also permit the irrigated area to be extended.

The extensive development of irrigation in the San Joaquin Valley dates from about 1870. The first large system constructed was that of the San Joaquin and Kings River Canal and Irrigation Company, which first diverted water from San Joaquin River in 1872. This was followed by extensive canal construction about Fresno, and in Tulare and Kern counties. By 1880, the total area irrigated in the San Joaquin Valley had reached 188,000 acres. The greater part of this was planted to cereals, a considerable acreage in alfalfa, and the remainder in orchards and gardens. About 1880, the fruit industry began to assume importance, and from this time on, irrigated agriculture developed rapidly. To about 1887, all the development was made by private enterprise. In 1887, the state legislature passed the Wright Act which provided for the organization and bonding of districts for the construction of irrigation works by vote of residents within the district boundaries. In 1897, the Wright Act was amended and superseded by the Bridgeford Act. Since that date development through the organization of irrigation districts has been very rapid and nearly all of the increase in the area irrigated has been accomplished through district organization. There are now about 30 organized districts in the valley.

The total agricultural area on the valley floor is 5,468,000 acres, and the total irrigated area in 1920 was 2,712,000 acres. This irrigated area includes a small acreage of lands in the foothills.

The present area irrigated has been largely dependent for its water supply on the direct diversion of natural stream flow and on the utilization of ground waters pumped from wells. The crops grown have been selected because of their adaptability to the uncertain irrigation season. Some areas or districts depending on natural stream flow,

have enjoyed a good supply either on account of their prior rights, or because the area utilizes only a very small part of the total flow of the stream. On the other areas, attempts have been made to utilize a larger part of the natural stream flow by applying some of the flood waters to lands devoted to the growth of grain, alfalfa or pasture, in the anticipation that these crops might be grown with occasional irrigation and thus avoid, to some extent, the total waste of flood waters. However, intensive irrigated development has been limited to those areas which have a dependable supply of water each year and during at least part of the usual irrigation season. The variable character of the stream flow tributary to the San Joaquin Valley, and the low summer flow, are such that the demands for water of the present area irrigated, even in years of exceptionally heavy run-off, are greater than the low water summer-flow of the streams.

Further development is dependent upon the better and more complete utilization of the water supply. This involves the economic application of water to the land to prevent excessive waste, the avoidance of abnormal conveyance losses, the recovery of underground waters through pumping and the maintenance of an adequate drainage, and the regulation of stream flow through the storage of flood waters. Such improved utilization of water is proceeding advantageously in a number of districts and large storage reservoirs are being built, or are in contemplation; ditches are being lined with concrete; drainage problems are receiving more serious consideration, and these are resulting in a more intensive cropping of the higher priced farm products and enhanced yield from the plantings of standard crops.

The rate of use of irrigation water varies considerably, not alone in different localities of the valley, but also on individual farms. The variations of climatic conditions are not sufficiently marked to account for the difference in water requirements of the several localities, while the precipitation increases and the temperature decreases from south to north, the difference in rainfall does not represent an equal difference in water requirements. The capacity of the soils to hold moisture is limited, and the late spring rainfall is small, and the precipitation is practically nothing during the normal growing season.

The variations of soil in texture are considerable, but as the larger part of the more porous soils are underlaid with impervious materials, the water requirements for sandy soils are not very different from those of the more retentive soils. The use of water varies with the kind of crops grown, but the largest variation in use of water on lands which have essentially the same climatic conditions, the same soil, and growing the same crops, is generally due to the amount of available water and its cost. With a supply regulated to insure irrigation during the full active growing period, and having experienced the destructive and expensive effects of the rise in the groundwater table, from deep percolation of excess irrigation water, a more saving use is going to be the practice. Alfalfa, which is an important crop, will produce full yields with 2.0 to 3.5 feet of water applied on the land. The smaller quantity is sufficient for the retentive soils where natural underground drainage is limited, and the groundwater less than eight to ten feet

from the surface; the larger quantity of water is required for maximum yields on the more porous soils and where subsoils have good underground drainage and a greater depth to the water table exists. Less than the smaller amount is now being used on the Patterson Water Company project, in the northwestern part of the valley, where 88 per cent of the 16,000 acres is alfalfa. This project derives its water supply by pumping from the lower San Joaquin River, water is available throughout the growing season, and the soils generally are retentive loams and clay loams. The average net duty for alfalfa with an ample supply throughout the season is 3.0 feet in depth in the San Joaquin Valley.

Deciduous orchards and vineyards are sometimes so situated that they derive sufficient moisture from the soil without surface irrigation, but as the future demand for irrigation water will undoubtedly lower the ground water elevation, these areas will have to be irrigated from surface supplies. The number of irrigations for a full season with a regulated flow, will range from two to four, and the quantity of water applied to the land from one to two feet. The average duty for orchards and vineyards in the San Joaquin Valley is 1.5 feet in depth.

Cereals are frequently raised on the more retentive soils with one heavy irrigation and on less retentive soils with two applications of irrigation water. Corn and other general field crops usually require two to four irrigations. Cereals are sometimes followed by a crop of corn, beans, or other summer crops in which case the land which is double cropped receives from two to four irrigations. This practice is increasing with the development of full season supplies.

The net duty for cereals, corn, sugar beets, potatoes and other general field crops, ranges from one to two feet, with an average net duty for these, allowing for the increase in double cropping, of 1.5 feet in depth.

The gross use for 214,000 acres served by the Fresno-Gould Canal for the seasons from 1915 to 1919, inclusive, is less than two feet and averages 1.64 feet in depth. This area is highly developed and 55 per cent is in trees and vines. Other large and highly developed areas, that receive water from Kings River, have gross uses of less than two feet, and even with this amount of water some of the lower lands have become water-logged and are in need of drainage.

These considerations reveal that the average net duty for the entire San Joaquin Valley floor, considering the extent to which the various crops will be grown and the water requirements of these crops, is two feet in depth. This net duty agrees well with that obtained at the present time on areas which have satisfactory irrigation supplies, and are devoted to an intensive and diversified farming and have a reasonably good standard of irrigation practice and agricultural methods. An average net duty of two feet with a desirable distribution through the season, will result in less water being added to the groundwater, a reduction in the expense for drainage, a smaller seasonal fluctuation in the water table and a lower water table during the summer months, and it will still furnish ample moisture for plant growth.

Considerable data are available on the monthly use of water on a number of projects in the San Joaquin Valley, which are favored with an

adequate supply for the entire irrigation season and the deficiency during the latter part of the season on other well developed projects, can be estimated. There are 263 records, an equivalent of one year's record on 9,304,000 acres, of actual distribution of the seasonal use of water in this valley. There are also 24 estimates by consulting engineers, covering an undetermined acreage, on the monthly use for a full seasonal supply. These data have been fully considered, and the desirable monthly use, expressed in terms of per cent of the total seasonal supply, is:

January -----	0 per cent
February -----	2 per cent
March -----	5 per cent
April -----	11 per cent
May -----	17 per cent
June -----	18 per cent
July -----	18 per cent
August -----	15 per cent
September -----	10 per cent
October -----	4 per cent
November -----	0 per cent
December -----	0 per cent

SECTION 8.

WESTERN SLOPE OF THE SOUTHERN SAN JOAQUIN VALLEY.

Total agricultural area-----	971,000 acres
Area under irrigation in 1920--	20,400 acres

This section is the portion of the western slope of the San Joaquin Valley that extends from near Buena Vista Lake on the south, to a point opposite Mendota on the north, and comprises portions of Kern, Kings and Fresno counties. Its surface rises gradually from the floor of the valley with increasing slopes towards the base of the Coast Range Mountains.

The larger part of the agricultural lands form a smooth sloping surface, which merges at the lower elevations into the flat lands of the valley floor. The general altitude varies from about 150 to 500 feet above sea level.

The run-off of the eastern slope of the Coast Range, which crosses this section, is concentrated in the channels of small intermittent streams, usually of not sufficient size to maintain well-defined channels very far down the slopes toward the trough of the San Joaquin Valley. A few of them have gravelly beds for several miles into the valley after their emergence from the foothills, but during dry years little or no water reaches the valley floor.

The soils are generally of heavier types and are mostly loams, silt loams and clay loams, underlaid by similar subsoils. They are free from alkali and are retentive of moisture. Their surface is generally favorable to cultivation and irrigation.

The climatic conditions are similar to those of the adjacent valley floor described in Section 7; the mean annual rainfall is somewhat less, however, averaging seven inches in depth.

Water is scant and very little of the area is irrigated. Because of the small rainfall, dry farming is precarious and but little is done. Most of the land is used for pasture. With irrigation the land is well adapted to growing alfalfa, deciduous fruits, small grain, sorghum and for the culture of vegetables.

The transportation facilities are the main line of a transcontinental railroad traversing the lower margins of this section and a branch line, crossing the southern end to Coalinga.

There is very little irrigated land in this section. The groundwater supply is very limited, and, if found at all, is at great depth below the surface. The development of irrigation for this section depends on the very limited supply from the intermittent streams of the eastern slope of the Coast Range, or on waters which may be brought in from outside sources. At best it will be expensive.

The water requirements are essentially the same as for the lands in the floor of the valley. The limited water supply, its high cost of development, and use on soils which are retentive of moisture, will result in a more saving use of water for this section than for other parts of the San Joaquin Valley. These considerations disclose that the average net duty of water for this section is 1.75 feet in depth.

The desirable monthly distribution in per cent of the annual supply is the same as that for the San Joaquin Valley floor, and is:

January	-----	0 per cent
February	-----	2 per cent
March	-----	5 per cent
April	-----	11 per cent
May	-----	17 per cent
June	-----	18 per cent
July	-----	18 per cent
August	-----	15 per cent
September	-----	10 per cent
October	-----	4 per cent
November	-----	0 per cent
December	-----	0 per cent

SECTION 9.

SANTA BARBARA, SANTA MARIA AND SAN LUIS OBISPO AREAS.

Total agricultural area.....	410,000 acres
Area under irrigation in 1920--	25,000 acres

This section is on the Pacific slope of the Coast Range Mountains, and extends from the crest of this range to the ocean shore, and from the ridge west of the Ventura River on the south, to the confluence of the Nacimiento with the Salinas River on the north. Portions of Ventura, San Luis Obispo, Monterey and all of Santa Barbara counties lie in this section.

The agricultural lands are on the ocean shore between Santa Barbara and San Luis Obispo, in the valleys and flat bottom lands, and on the gentle slopes of low hillsides surrounding the valleys. These agricultural valleys are mostly at altitudes of less than 1000 feet, excepting the Cuyama Valley which is above 2000 feet.

The coastal range which traverses this section is formed largely of sedimentary deposits of shales, sandstones and conglomerates. There are, however, isolated granitic mountain masses. The soils formed from their erosion, are predominantly sandy loams, with loams and clay in some of the interior valleys.

The climate is moderate and equitable and there are no great departures from the mean temperatures. It exhibits the moderating influence of the Pacific Ocean, the average winter temperature being around 50 degrees. Fogs are common and conserve the soil moisture by retarding evaporation of water from the cropped area. The winter is the principal period of precipitation. The active growing season is long and without great extremes of heat. Dry farming is profitably practiced. The moist climate along the coast is favorable for the raising of grain, beans, sugar-beets and vegetables, and there are considerable areas devoted to the raising of these and flower seeds.

The growing seasons for the different crops overlap and in the aggregate extends throughout the whole year. The principal precipitation occurs in the months of November to March, inclusive, and averages over sixteen inches. The interior valleys and tablelands are suitable for raising deciduous fruit trees, sugar-beets and alfalfa, which require but one or two irrigations per season.

The available water supply is adequate for the coastal valleys, but is deficient in volume for the regions away from the coast. The trend of agricultural development is toward intensive cultivation of small farm units.

The use of water for the different crops varies from six inches or less for beans, vegetables, and other shallow-rooted plants grown along the marginal agricultural lands adjacent to the coast, to twenty-four inches or more for alfalfa in the interior valleys. The water requirements for lands in this section will be less than for Section 1, the Los Angeles area, which adjoins it on the southeast, and should be essentially the same as for Section 2, the San Diego area. The average net duty for this section therefore, is 1.5 feet in depth.

The desirable monthly distribution in per cent of the annual supply is:

January	-----	2 per cent
February	-----	2 per cent
March	-----	2 per cent
April	-----	5 per cent
May	-----	12 per cent
June	-----	16 per cent
July	-----	20 per cent
August	-----	16 per cent
September	-----	13 per cent
October	-----	8 per cent
November	-----	2 per cent
December	-----	2 per cent

SECTION 10.

SALINAS AND CONTIGUOUS VALLEYS.

Total agricultural area-----	296,000 acres
Area under irrigation in 1920--	72,000 acres

Most of the agricultural lands of this section are located in the lower Salinas Valley in Monterey County, and extend from the confluence of Nacimiento and Salinas rivers on the south, to the mouth of the Salinas River on the north. There are other smaller areas of arable lands to be found in the valleys of Carmel, San Antonio, Priest, Bitter-water and Peach Tree, in Monterey and San Benito counties.

The soils of the Salinas Valley are derived from the rocks of the Coast Range which include a variety of shales, sandstones, limestones, schists, gneiss and granitic rock. The soils of the bottom lands and the alluvial delta in the lower portion of the valley consist of recent alluvial deposits eroded from the variety of rocks occurring in the drainage basin of the Salinas River. The soils range in texture from loose drifting sands to heavy clay adobes. With the exception of the lighter textured sandy types, they are of moderate to high organic-matter content and are productive under irrigation. Drainage conditions are not quite so favorable for fruits in the alluvial delta as in the more elevated lands and terraces, but the former is more favorably situated for irrigation and is underlaid by friable and permeable stratified sediments.

The average annual precipitation over the floor of the lower Salinas Valley is fifteen inches, of which over 80 per cent occurs from the first of November to the end of March. The rainfall during the remaining seven months is so small and uncertain that it is a negligible factor in nourishing plant life. Soil moisture is conserved by the prevalence of summer fogs; on the other hand, the evaporation of moisture is increased by the trade winds which enter the valley from Monterey Bay.

In common with many other parts of the state, cereals grown without irrigation constitute the principal crop. Here, as elsewhere, the yields from grain crops have decreased and other crops, many of which are irrigated, have taken their place. Conditions in the lower Salinas Valley are well adapted to the growing of such crops as alfalfa, sugar-beets, potatoes and beans, as well as deciduous orchards, and under a suitable system of crop rotation large returns are possible under irrigation. The greater portion of the agricultural lands of this section have adequate railroad facilities. The Salinas Valley is traversed from end to end by a main line railroad.

Water supply for irrigation may be developed from the surface flow or the storage of the flood flow of streams, and the pumping of underground water. Storage of the large quantity of flood water which is discharged annually into Monterey Bay, would also remove the flood menace which threatens destruction to property along the river banks. Pumping from underground water would provide an excellent irrigation supply as well as prevent injury through the water-logging of lands by too high a rise of the groundwater level such as has been experienced in other localities similarly disposed.

In the past, development under irrigation has been retarded by the large number of ranches of more than 10,000 acres each. Until recently, the sentiment has been opposed to irrigation. As time goes on, the large land holdings will be subdivided and a more intensive utilization of the land be brought about. The increased productivity of the lands under irrigation will gradually establish the practice throughout the section.

The measured net annual use is 1.82 feet in depth. This is the mean of five records and is the equivalent of one year's measurement on 5790 acres. These data reveal that the average net duty is 1.75 feet.

About nine inches of rain falls on an average, during the first four months of each calendar year, and for the crops now grown, little irrigation water is needed until the latter half of April, neither will water be needed, as a rule, after the last part of September. The irrigation season may, therefore, be said to extend from April 15th to September 30th, with a small use for special requirements in both March and October.

The desirable monthly distribution in per cent of the annual supply will approach that of the San Joaquin Valley, modified for a larger spring rainfall, and for the lower mean monthly temperatures that obtain in the Salinas Valley, and is:

January -----	0 per cent
February -----	0 per cent
March -----	2 per cent
April -----	12 per cent
May -----	18 per cent
June -----	20 per cent
July -----	20 per cent
August -----	16 per cent
September -----	10 per cent
October -----	2 per cent
November -----	0 per cent
December -----	0 per cent

SECTION 11.

SANTA CLARA AND ADJACENT VALLEY AREAS.

Total agricultural area-----	530,000 acres
Area under irrigation in 1920--	147,000 acres

This section lies between the Pacific Ocean and the crest of the Mount Diablo Range, and extends in a southeasterly direction from San Francisco Bay, to the ridge dividing the watersheds of the Pajaro and Salinas rivers, and also to the lower part of the San Benito River, a tributary of the Pajaro River. It includes the agricultural lands of all San Mateo, Santa Cruz, Alameda and Santa Clara counties, most of Contra Costa County, together with small areas in Monterey and San Benito counties. These agricultural lands lie for the most part in the valleys of Santa Clara, Pajaro, Livermore, San Ramon, and Ygnacio, and on the coastal plains bordering on the southern portion of San Francisco Bay and skirting the shores of the Pacific Ocean.

The soils of these valleys consist of alluvial deposits derived from the rocks of the Coast Range, which consist mainly of shales and

sandstones, with minor associated areas of igneous rocks. These rocks generally contain considerable lime and the resulting soils have not been entirely leached of soluble materials. In many cases they are distinctly calcareous.

The soils have been distributed mainly as alluvial fan deposits by minor intermittent streams and by surface wash. They, therefore, occupy gently sloping areas marginal to the foothills and mountains, and are frequently traversed by somewhat deeply cut stream channels. In consequence, natural drainage conditions are well developed, though flat basin-like areas of poor drainage occur in regions adjacent to tidewater. The soils, which are of recent deposition and not materially altered by weathering in place, are of brown to black color, and of loam, clay loam, and clay texture with minor silty, fine sandy or gravelly variations. Prevailing texture and structure are such as to favor water-holding capacity and retention of moisture, under suitable cultural methods. Some of the heavier textured types, however, have pronounced adobe characteristics and demand careful management in irrigation and cultivation. Limited areas occur in which soil materials occupying the more elevated slopes, have been modified by weathering in place, leaving compact subsoils in which percolation and subdrainage is arrested, and which are less well adapted to tree fruits and the deeper rooted crops. The soils of these valleys are represented by a wide variety of types, which, owing to their pronounced physical character and to the special adaption to certain fruits, vine and truck crops, have materially influenced the development of agricultural and cultural methods.

The average annual amount of rain which falls on the agricultural lands of this section, is eighteen inches: of this total, about three-quarters occurs during the four rainy winter months of December, January, February and March; the four summer months of June, July, August and September are practically rainless, and have a mean precipitation of but half an inch, while the remaining spring and autumn months make up the balance, or one-quarter of the total.

The temperature is uniform. The mean annual temperature is 58 degrees, and there is less than 19 degrees variation between the mean temperature of the coldest month in winter, and the warmest in summer.

The transportation facilities of this section are exceptional. Three transcontinental railways traverse the locality, which have their terminals on the ocean harbor of San Francisco Bay, in the northern portion of the section. Numerous branch railway and feeder lines, sidings, stations and yards are distributed throughout the area. Many hard surfaced highways give ease of communication and opportunity for motor transport.

Marketing centers with storage plants, precoolers, ice and refrigerating plants, canneries and exaporators, are interspersed over the district and in some of the valleys, the line of communication is bordered by almost continuous urban settlements.

Forty to fifty years ago, wheat was the prevailing crop. Later, orchard trees were planted in the most favorable locations, and the fruit from these proved so profitable that the orchard area has been

greatly increased. Owing to the demand for truck crops and berries to supply the urban population around San Francisco Bay, about twelve per cent of the total irrigated area is devoted to the growing of these products. For the same reasons, dairy products are readily marketed at a profit, and about as large an area is planted to alfalfa and other forage or root crops as there is for truck farming. While fully a third of the cultivated area is still in cereals, the trend of development, influenced by more profitable returns, is in the direction of more deciduous orchards; prune trees are far in the lead and also more truck, vineyards and small fruit are being planted. When the greater part of the total area of agricultural lands is irrigated, the present trend of development indicates that sixty per cent of the section will be planted to deciduous orchards, fifteen per cent to grain and hay, ten per cent to truck and berries, ten per cent to alfalfa and other stock feed, and the remainder to vines and miscellaneous crops.

For the lands thus far irrigated, water has been obtained for the most part, by pumping from wells. This general practice has lowered the ground water level and prevented the water-logging of soils, except in a few limited areas. This draft on the underground basins, particularly in many parts of Santa Clara Valley, has been much greater than the natural replenishment resulting in a decided lowering of the water table, a lessening of the discharge of wells, and an increase in the cost of pumping water. While the streams are torrential in character, being high after heavy rains in winter and early spring and very low or without water in midsummer, many small and medium sized reservoir sites may be utilized for the storage of water. By storing a part of the run-off from non-tillable lands and conveying the stored water by gravity to arable valley lands in the immediate vicinity, a much larger area can be irrigated from the surface run-off than is now watered. The seepage losses from such reservoirs and gravity canals, and deep percolation losses from the irrigated fields, would tend to raise the ground water level in underground basins, increase the area irrigated from wells, and decrease the present cost of pumping.

Taking into consideration the amount of the winter rainfall, the compactness of the arable soils and subsoils, the relatively low evaporation, and further that the greater part of the crops raised in the future will require a comparatively small quantity of irrigation water, the data disclose that the average net duty is 1.5 feet annually on the agricultural lands of this section.

The monthly use of water depends chiefly on the crops grown. Since the climatic and soil conditions are well adapted to the production of deciduous fruits, more especially prunes and apriots, it is reasonable to expect that this crop will predominate in the future as it does at present, and that it will influence to a large extent, the monthly distribution of the seasonal use of water. The large acreage devoted to prunes requires the greatest quantity of water in June, with more in September and October, than in July and August. Offsetting this unequal monthly distribution, the alfalfa and truck crops require a relatively large quantity of water in July and August.

Considering the records of the monthly use of water, and of consumption of electric power for pumping groundwater for agricultural purposes during the past few years, the desirable monthly use of irrigation water in per cent of the total seasonal supply is:

January -----	0 per cent
February -----	0 per cent
March -----	4 per cent
April -----	6 per cent
May -----	15 per cent
June -----	20 per cent
July -----	15 per cent
August -----	15 per cent
September -----	14 per cent
October -----	9 per cent
November -----	2 per cent
December -----	0 per cent

SECTION 12.

DELTA LANDS OF SAN JOAQUIN AND SACRAMENTO VALLEYS.

Total agricultural area-----	453,000 acres
Area under irrigation in 1920--	390,000 acres

This section is located along and adjacent to the lower stretches of the Sacramento, San Joaquin and Mokelumne rivers. These lands lie south of Sacramento, west of Stockton, north of Lathrop and Tracy and extend westerly to Suisun Bay. They include portions of San Joaquin, Sacramento, Contra Costa, Yolo and Solano counties.

The agricultural lands of this section are of a flat surface conformation. Originally a tule marsh, the land surface of which was below sea level, occupied a very considerable part of the section. Numerous winding channels and sloughs connect with the several branches of the river, and divide this section into islands and peninsulas of a few hundred to several thousand acres in extent.

The banks along the channels have been built up through the deposit of sediment that takes place during the overflow from these channels, and these banks are usually several feet above the general level of the land lying away from the channels. The lands in the peninsulas rise above sea level and continually increase their altitude as they approach the body of land from which they project, but no part of Section 12 is more than a few feet above sea level.

Most of the area is now either fully or partly protected against overflow, occasioned by high tides and floods, by surrounding levees that have been built on or near the banks of the channels that make their devious way through this section. Interior drainage of the excess rain water is collected by means of ditches, and removed by pumps, which also serve to collect and remove seepage waters from the rivers rising too near or above the surface level of the low lands.

The more elevated banks and the islands farthest up stream in the rivers are composed of a silt loam. The back or land side of the peninsulas merge into the same soil as the main body land, which is generally a sandy or silt loam. The main body of these islands and peninsulas is composed of a silt loam and decayed roots of tule and other aquatic

plants, and varies from soils in which the silt loam predominates, to lighter peat soil containing little mineral matter. The heavier peat soils along the margin of this section may attain a depth of ten feet, and are underlaid by sediment or clay. Much of the lighter peat soil will float, and is of great depth, underlaid with a coarser peat. The soils of this delta are known for their remarkable productiveness.

The climatic conditions differ from the remainder of the San Joaquin Valley, in that the summer temperatures are somewhat lower and the humidity is higher. The mean annual rainfall is about eighteen inches.

The most important crops are potatoes, asparagus, corn, barley, beans and celery. Some of the best orchards in the state are located on the higher lands adjacent to the river banks. Alfalfa is grown on the silt loam and heavier peat soils.

Excellent water transportation is available for nearly all the area, so that the products of the district can be cheaply delivered to Sacramento, Stockton or San Francisco. There are a number of good highways, and good railroad transportation facilities are available along the margins of this section.

The water supply for these lands consists of ground moisture replenished from rainfall and river seepage, and that taken out from the adjacent rivers or sloughs and delivered over or through the levees by siphons, pumping plants or culverts.

During the winter and spring months, the water level in the rivers and channels is considerably higher than the surface of the interior lands, and drainage pumps are operated to remove surplus rainfall and seepage water. Inundation or an excessively high water table is so prevented. Beginning in the late spring, and lasting through the remainder of the growing season, the water table is too low for sub-irrigation of the predominant shallow-rooted crops, and the dry top soil is therefore moistened by irrigation. Most of the area is irrigated by running sufficient water in small ditches to raise and maintain the water table at the desired depth below the surface. Some of the higher lands in orchard or alfalfa, are surface irrigated. The depth to the water table for much of this land is not over six feet, and is maintained nearly uniform throughout the growing season.

The high productivity of these delta lands encouraged early efforts toward their reclamation, and nearly all of the area is now organized in reclamation districts, which have constructed protection works against inundation by the high water in the adjacent channels, occasioned by floods and tides. The lands are generally intensively farmed and fully utilized. Future development will consist principally in construction of works for greater safety against floods, and in the extension of irrigation to all the lands in the delta.

Much of the land drains readily, and the surplus irrigation water which reaches the drains, is pumped back into the rivers or channels during the same period that irrigation water is also pumped into the district. Two years' records of the irrigation water pumped in and drainage water pumped out, of a typical district in this area, indicate a use of somewhat less than 1.5 feet in depth. These considerations disclose an average net annual duty for the entire section of 1.5 feet.

The monthly use of water is determined by the presence of surplus rain and seepage waters in the soil. Irrigation is not necessary during the periods in which the drainage pumps operate to hold the ground water plane down. For this reason, irrigation is not started as early as in the adjoining parts of Sacramento and San Joaquin valleys. The irrigation season is therefore shorter, and because of the nature of the crops, the maximum use occurs in July.

The desirable monthly distribution of the irrigation supply, in per cent of the total seasonal use, is:

January	-----	0 per cent
February	-----	0 per cent
March	-----	0 per cent
April	-----	0 per cent
May	-----	8 per cent
June	-----	22 per cent
July	-----	30 per cent
August	-----	25 per cent
September	-----	15 per cent
October	-----	0 per cent
November	-----	0 per cent
December	-----	0 per cent

SECTION 13.

SACRAMENTO VALLEY FLOOR.

Total agricultural area-----	2,694,000 acres
Area under irrigation in 1920--	662,000 acres

This section comprises about one-third of the total agricultural area of the great central valley, and contains one-eighth of the total agricultural area of the State of California. It extends from the delta of Sacramento River on the south, to Redding on the north, a distance of 170 miles; it contains land in Solano, Sacramento, Placer, Yolo, Sutter, Yuba, Colusa, Glenn, Butte, Tehama and Shasta counties.

The average slope of the floor of the valley from north to south, is about three feet per mile, attaining to a maximum of five and one-half feet and a minimum of less than one foot. From Redding to the mouth of Stony Creek, a distance of about ninety miles, the Sacramento River flows through its deepest cut in the valley floor, but below this point, through most of its course, the river occupies a ridge higher than, and nearly parallel to, troughs in the bottom of the overflow basins on either side. The flood area on the west side of the river, is separated into two basins, the Colusa on the north and the Yolo on the south, by a ridge of detritus deposited by Cache Creek. There are four basins on the east side of the river, which are known from north to south as the Butte, Sutter, American and Sacramento basins, and are separated by the Marysville Buttes, the Feather and American rivers respectively. On the west side of the river, there are alluvial fans or ridges of considerable area at the mouths of tributaries. These fans or ridges have slopes that are much steeper, and elevations that are greater, than the adjacent floor of the valley; but most of the irrigable lands of the section are flat in slope and lie below the 200-foot level. They

attain a maximum of 550 feet in the extreme north, and drop to a minimum in the south, of less than 15 feet in elevation.

Most of the soil of this section is sedimentary in origin. About thirty per cent of the area is clay or clay adobe; of the remainder, about one-half is silt, sandy or gravel loams, and the balance a clay loam. Centrally located, for the most part in the poorly drained sections of the valley, are considerable areas in alkali lands, but in these areas the highly concentrated form of salts, injurious to plant growth, is not common. On much of the land, good crops of grain have been produced by dry-farm methods, and during the last few years large areas have been successfully developed to rice culture, lands that hitherto have been thought unsuitable to agriculture. The area of alkali land, which is irreclaimable and of no agricultural value, is a very limited portion of the entire section. Hardpan and indurated clay subsoils are encountered at various depths in many localities throughout the valley.

Climatic conditions are very similar to those of the southerly portion of the great valley, with the exception that the rainfall is somewhat greater. Of the annual precipitation, 80 per cent occurs from November to March, inclusive. The range is from about fifteen inches in the southern, to thirty inches in the northern part of the section, and averages twenty-two inches for the whole area. The mean annual temperature is 63 degrees, with a range of monthly means from 46 degrees in January to 80 degrees in July. Minimums below 20 degrees and maximums of 110 degrees, are of occasional occurrence. During the rainy season the prevailing winds are from the south. There are drying north winds which vary in intensity during the spring and summer months. The latter are of low humidity and have a decided influence in increasing the water requirements of the entire section.

The growing season is long and has an average frost-free period from the middle of February to the last week in November.

At the present time most of the land is dry-farmed to grain. Of the irrigated portion, about one-fifth is devoted to rice, and the balance to alfalfa, fruits and miscellaneous crops. There are portions of the section which appear to be particularly adapted to specialized crops, such as rice, olives, almonds and certain deciduous fruits, and these localities are gradually developing their specialities. The rice-growing area is located largely in South Glenn, South Butte, Colusa, Sutter and Yolo counties. Oranges are grown in Glenn and Tehama counties; olives are a specialty in Sutter, almonds in Yolo, and in nearly any one of the counties some particular fruit predominates. Alfalfa is a stable forage crop that can be successfully grown on most of the area, if the moisture conditions are made favorable for it.

The trend of development indicates that a large portion of this section, when irrigation supplies have been developed for its watering, will be devoted to general crops and to the production of staple food-stuffs, dairy and meat products.

Transportation facilities are excellent. There are two transeontinental rail lines, four branch lines, four electric railways and numerous highways, together with water transportation on the Sacramento River to San Francisco Bay.

The principal sources of water supply are the Sacramento River and its tributaries. The most important tributaries on the east side are the Pit, Feather and American rivers; on the west side the Thames, Stony, Cache and Putah creeks. These streams have large flows during the winter and spring, but the summer flows dwindle to almost nothing in the Coast Range streams, and in the Sierra streams, to small fractions of the winter discharge.

Natural drainage conditions are very fair in the higher ground at the rim of the valley, but in the low land of the overflow basins, the heavy subsoil and low elevation of the land require particular attention to artificial drainage.

Prior to 1880, water was used for irrigating but a few small areas in the Sacramento Valley. The works were crude, and the lands irrigated were in small tracts adjacent to the streams. In 1887, an attempt was made to bring a larger area in Glenn and Colusa counties under irrigation through the organization of the Central District under the State Irrigation District Act. Difficulties in financing the district caused construction work to be abandoned in 1891, but some land was brought under irrigation and continued the use of water. In 1903, the works were taken over by a land and water company which was succeeded later by a number of irrigation districts, the largest of which is the Glenn-Colusa District. In Glenn and Colusa counties, there are now six districts organized under the state law and one constructed under the Federal Reclamation Act, and their irrigation works are practically all completed. This development has taken place since 1910.

On the east side of the river, development started earlier, mostly under private enterprise. It has also progressed rapidly during the past ten years. There are now considerable areas which are served by pumping ground water from wells. As a whole, the irrigation works already constructed in this section are of a capacity far exceeding the unregulated water supply, and, unless in the future, reservoirs are constructed to store winter floods, the rapid development now in progress will be checked or may cease altogether.

The average measured annual use for this section is 3.88 feet in depth, but the area on which these measurements were made comprises a much larger percentage of land in rice than will occur on the full development of the section.

About 200,000 acres is the maximum which will be devoted to rice culture. Of this no more than one-half, to at most three-fourths, will actually be planted to rice each year; the balance will be either fallow, or planted to crops on which no water will be used, in order to destroy the water grass. Use of water for rice has been from four to seven feet per year and averages around six feet in depth. For the whole area primarily devoted to rice, the average annual water requirement is three feet. The average net duties for other crops are: orchard and vineyard, 1.5 feet; alfalfa and general crops, 2.7 feet; rice, for the portion of land in crop, 6 feet, or for the total area devoted to rice, 3 feet. Some citrus fruits will be grown, but the amount of water required by these in excess of 1.5 feet should be offset by the much larger area of other fruits requiring less than this amount. Based on the trend of development

and these considerations, the average net annual duty of water for the entire section is 2.25 feet in depth.

Much data have been collected on the monthly use of water. During years when there is a short rainfall after January, some water is used prior to April 1st, but the irrigation season under average conditions opens about April 1st and closes in October. Oranges and lemons usually require water after October, but the area on which these crops will be grown, is small and does not appreciably affect the general distribution. The desirable monthly use is indicated by the measured use in the past. Some projects or systems serve primarily rice lands, while others supply water for general crops with no rice. The monthly use on these projects, combined in the proper proportion for rice and other crops, determine the desirable monthly distribution of the annual supply.

The desirable monthly distribution in per cent of the seasonal supply for this section, is:

January	-----	0 per cent
February	-----	0 per cent
March	-----	1 per cent
April	-----	5 per cent
May	-----	16 per cent
June	-----	20 per cent
July	-----	22 per cent
August	-----	20 per cent
September	-----	12 per cent
October	-----	4 per cent
November	-----	0 per cent
December	-----	0 per cent

SECTION 14.

SIERRA FOOTHILLS, AND ROLLING PLAINS EAST AND WEST OF SACRAMENTO VALLEY FLOOR.

Total agricultural area-----2,305,000 acres
Area under irrigation in 1920-- 87,000 acres

This section includes all of the agricultural lands above the floor of the Sacramento Valley, lying along and including the foothills of both the Sierra and Coast Range mountains. It extends from the Mokelumne River on the south, to the limits of the great central valley on the north near Redding, and thence around the north end of the valley and down the western side to Cache Creek near Woodland. About four-fifths of the land lies on the east side of the valley floor between the Mokelumne and Feather rivers. The largest compact area on the west side lies in southern Shasta County.

The arable lands of this section are not continuous, but consist for the most part, of detached areas of low rolling hills and small valleys somewhat broken by gullies and canyons. The variation in altitude is great, ranging from around 100 feet near the floor of the valley to 2500 feet in the vicinity of Nevada City, with isolated small areas above 4000 feet. However, most of the lands lie below the 600-foot contour.

The soils are primarily of weathered rock in place. In the valleys, there are sedimentary and alluvial deposits, but the parcels so formed are comparatively small. A few minor areas of sandy loams occur on the higher slopes and along the margin of the valley floor. Shallow soils occur on some of the foothill lands, but generally the soils are of good depth.

Climatic conditions below the 1500-foot elevation, do not vary greatly from those of the floor of the valley. The summers are long and dry and most of the precipitation occurs between November and April. Precipitation generally increases with altitude and ranges from twenty inches to forty-five inches, and averages thirty-two inches per year. Temperatures below the 1500-foot level vary little from those of the floor of the valley. For the whole section the annual mean is 57 degrees. Lying along the foothills, are warm belts of considerable extent, where the winter temperatures are notably higher than the average for the valley floor, while in the higher altitudes much lower temperatures are experienced. The growing season for the section as a whole is somewhat shorter than for the valley floor. The average frost-free period is from the latter part of March to the middle of November, excepting for limited areas located at the higher elevations.

The variations in elevation, rainfall and temperature, make a wide range of crops possible in this section. Citrus fruits are successfully grown throughout the thermal belt, which varies in altitude but is always below the 1000-foot contour. Apples, pears and plums are extensively grown on the higher elevations, and peaches, cherries, prunes, vines, olives and a great variety of fruits are grown on all but the highest elevations. Alfalfa thrives on lands of suitable surface conformation and texture. Large areas not irrigated, are devoted to grain and pasturage. Fruit growing will dominate future irrigation development.

Transportation facilities are excellent, with two transcontinental railroads through the section and electric lines traversing portions of the area.

The surface conformation of this section is, in general, very favorable to natural drainage and, with proper precautionary measures along the valley margin, no serious water-logging of land should occur.

The Sacramento River and its tributaries constitute the available water supply for this section. The first irrigation practiced in the section was undertaken as a secondary use of water-supplies developed for mining purposes. The water was applied to small tracts planted in fruits and vegetables and located along the main streams. Many of the old mining ditches are still in operation, but water service for irrigation and power has long been their principal use. A large portion of the irrigated land of this section is served through privately-owned irrigation works. There are also many small cooperative farmers' ditches and a number of irrigation districts organized under the State Act. Of the later all are of recent origin, except the Browns Valley District, which was organized in 1888. But a comparatively small part of the agricultural lands are irrigated. There has been great impetus

to irrigation development during the past ten years, and a number of irrigation projects of magnitude are at present pending.

There is quite complete data on the quantity of water used in growing the various crops for which the section is noted. The water supply for the land now under irrigation is, with few exceptions, ample, and the amount applied closely represents crop needs. Measurements indicate that the use of water now ranges from 1 foot to 2.5 feet in depth, depending largely on the variety of crops and soil. The average for all measurements is 1.47 feet deep. It is not likely that, as this area is further developed to irrigated crops, there will be much change in the relative proportion of crops now grown, and the water requirements will be about the same for the future as in the present. The average annual duty of water for the entire section is 1.5 feet in depth.

The desirable monthly distribution expressed in per cent of the seasonal irrigation supply is well indicated by the past use on irrigation systems, and is:

January	-----	0 per cent
February	-----	0 per cent
March	-----	2 per cent
April	-----	2 per cent
May	-----	15 per cent
June	-----	20 per cent
July	-----	22 per cent
August	-----	20 per cent
September	-----	13 per cent
October	-----	5 per cent
November	-----	1 per cent
December	-----	0 per cent

SECTION 15.

NORTH COAST AREA.

Total agricultural area-----	624,000 acres
Area under irrigation in 1920--	22,300 acres

This section extends from San Francisco Bay to the Oregon line, and comprises the westerly slope of the Coast Range Mountains north of San Francisco. It contains the drainage basins of the Eel, Russian, Mad, Salmon, and the lower portions of the Trinity and Klamath rivers, together with those of Sonoma and Napa creeks.

The elevation of the arable land varies from just above sea level to 1500 feet, but most of it lies below elevation 500 feet. The section is divided into five main basins, one on each of the Russian, Eel and Mad rivers, and on Sonoma and Napa creeks. There are numerous small mountain valleys throughout the area, the largest of which is adjacent to Clear Lake. The basin of the Russian River contains the largest compact body of tillable land. All parts of the section are more or less cut up by the numerous tributaries which enter the main streams.

In general the soil is of sedimentary formation and quite fertile.

The temperatures over the coastal valleys are moderate and quite uniform throughout the whole section, and they are modified by the proximity of the ocean. The mean annual temperature is 56 degrees. The rainfall, occurring mostly between November and April, reaches

100 inches or more in the extreme north and averages over 35 inches per annum for the whole section. While the summers are long there is little extreme heat. Along the coast there is some rainfall during the summer months. Over a considerable area summer fogs have an influence on moisture conditions by reducing evaporation and plant transpiration.

The growing season is somewhat shorter than for the Sacramento Valley to the east. The average frost-free period is from the first week in May to the latter part of October.

The cultivated areas in the southern or main portion of the section, are devoted to growing fruits and grapes. In the north, forage is the principal crop. Transportation and marketing facilities are good for the area south of Humboldt County. Ocean and rail transportation are available for the coastal regions of most of the northern part of this section.

Because of the sloping surface conformations of the agricultural lands in this section, the drainage of the surplus water has presented no difficulties. Water from the Russian, Eel, Mad and Klamath rivers and their tributaries will amply supply irrigation needs.

Due to greater rainfall, irrigation development has not received the impulse that it has in other parts of the state. While orchards and vineyards thrive without irrigation, especially near the coast, it is a distinct advantage to irrigate all crops wherever accessory waters are available. In time, irrigation will be the general practice throughout most of the section.

The average measured net annual use is 1.52 feet but the considerations here presented reveal that the desirable net annual duty of water for this section is 1.25 feet in depth.

The desirable monthly distribution of the irrigation supply, in per cent of the total seasonal use, is:

January	-----	0 per cent
February	-----	0 per cent
March	-----	0 per cent
April	-----	10 per cent
May	-----	20 per cent
June	-----	20 per cent
July	-----	20 per cent
August	-----	17 per cent
September	-----	11 per cent
October	-----	2 per cent
November	-----	0 per cent
December	-----	0 per cent

SECTION 16.

NORTHEASTERN MOUNTAIN-VALLEY AND PLATEAU AREAS.

Total agricultural area-----1,598,000 acres
 Area under irrigation in 1920-- 333,000 acres

This section extends from near the crest of the Sierras north of Lake Tahoe, to Oregon and Nevada, and consists of mountain valleys and plateaus of the northeastern part of the state; it includes all of the arable lands of Siskiyou, Modoc and Lassen counties, practically all of

Sierra and Plumas counties, and a portion of the lands in Shasta County.

The agricultural lands are located on plateaus and in mountain valleys that range in elevation from 2,000 to 5,000 feet. Generally the slopes are moderate and the larger areas of agricultural land are comparatively level. Many lakes are scattered throughout the section.

The soils are formed principally from the weathering of volcanic rocks and are generally light and easily tillable. There are many tracts of swamp lands which require drainage before they can be cultivated, but when reclaimed, are very fertile.

There is a wide variation in the annual precipitation, ranging from less than 14 inches in the northern part of the section to more than 40 inches in the southern part. The annual average is 22 inches. Temperatures are low with great extremes between summer and winter. The annual mean is 48 degrees. The growing season is short. The average frost-free period extends from the middle of June to the last week in August.

About five-sixths of the area lies within the arid belt in which little can be grown without irrigation. The land now under irrigation is almost entirely cropped to pasture, hay and grain, and its ownership is in large tracts. Climatic conditions will limit the introduction of new crops. Only fair transportation and marketing facilities are afforded a large portion of the area.

With the extension of irrigation, the water-logging of much land and the accumulation of alkali at the ground surface is apt to occur over large tracts in this section.

This region is principally dependent for its water supply upon small streams and the headwaters of the Shasta, Pit and Feather rivers; and this source of supply has reached its maximum development unless winter flood waters are stored.

Water has been used for irrigation since the early settlement of the section, but only within recent years has development been rapid. Much of this in the past has been through the cooperative efforts of the farmers. Some large projects have been undertaken by private interests, and plans have recently been formed for extensive projects by irrigation district organizations.

The present use of water ranges from 1.25 feet to about 2 feet in depth. The average for the section, determined from twenty-six records equivalent to one year's measurements on 437,200 acres, is 1.30 feet. Taking into account the shortage of water that now exists during the latter part of the season over a very large area in the section, crop requirements, prevailing temperatures, rainfall and other climatic conditions, and past use, the average net annual duty of water for this entire section is 1.75 feet in depth.

The monthly distribution of the annual supply is indicated from twenty-six records, equivalent to one year's record on an agricultural area of 306,440 acres. These should be increased, however, on account of the short water-supply late in the summer.

The desirable monthly use, expressed in per cent of the total seasonal supply, is:

January	-----	0 per cent
February	-----	0 per cent
March	-----	0 per cent
April	-----	3 per cent
May	-----	14 per cent
June	-----	24 per cent
July	-----	26 per cent
August	-----	21 per cent
September	-----	12 per cent
October	-----	0 per cent
November	-----	0 per cent
December	-----	0 per cent

CHAPTER VI.

NET AREA IRRIGATED IN LARGE AGRICULTURAL DISTRICTS.

Contingent to an intensively developing agricultural community; the rural and urban dwellings, routes of communication and transportation, industries, and improvements, occupy an increasingly larger portion of the total area. The locality's natural resources enhance in value, augmenting the wealth with the increasing income derived. The riches received and credit created are spent in enterprises, the products of which are essential to agriculture, or in manufactories, canneries and evaporators, or other industries, to further prepare the agricultural product for the use of the public. Progress is further reflected in the appearance and development of facilities for the curing, chilling, storage and sale of the farm product; in the extension and improvement of means of transportation; in the construction of warehouses, sidings, yards and freight terminals. These improvements as they are inaugurated, require that areas of agricultural lands be given up to industry.

More roads are required; cities and towns extend their boundaries; villages arise to become towns, develop into cities, swarming with inhabitants who find employment in manufactories and industries developed coincident to, or as consequence of, the prosperity initiated with the successful agricultural expansion. While the number of small farm holdings are increased, the land is more vigorously cultivated, and production per acre is enhanced; the farm buildings needed for this greater activity, occupy a larger proportion of the cultivable area. The total value of improvements made, wealth created, and income derived from agriculture, vastly increases but the farmed area tends to diminish with the continuance of intensive agriculture. At the same time an opposing tendency comes into action, directed towards increasing the farmed area by bringing new areas into cultivation, previously unprofitable to farm, but now productive through the demand created by extended markets. These tendencies effect contrary results, one making accretions to the cultivated area and the other causing subtraction therefrom, largely neutralizing as communities mature. In the end, the conclusion is inescapable that all the cultivable lands will not eventually be planted to crops, for roads, canals, warehouses, railroads, farm buildings and dwellings, villages, towns and cities there must be, and these will increase, but irrigation water is required only for the cropped area.

The extent of settlement which will prevail in the future, may be conceived only by comparison with the rise and growth of communities which at this day have reached a stage of fairly dense population. The Santa Clara Valley, in Central California, is one of the highly developed farming areas of the state, and here eight per cent of the total agricultural lands are occupied by cities and towns, and these are still growing. In the San Gabriel Valley, in southern California, a

rich farming area tributary to Los Angeles, seven per cent of the total agricultural area is within the boundaries of cities and towns, and these are growing at an accelerated rate.

There are lands that are naturally unfit for cultivation, such as rocky and alkali spots, high knolls and stream beds. These will never be irrigated. Further, in each season a portion of the total area will remain fallow, other portions will be planted but not watered, and irrigation water will not be required for either. In a closely-settled section, the sum total of the unirrigated land may sometimes be a very considerable part of the total area.

Since cities of mature growth and dense population use water about equal to that required for irrigating crops on an equal area, the total consumption of water in any district for both domestic and irrigation supplies will not become much less as agricultural land is relinquished for city development. The expansion of less mature and more dispersed towns will, however, tend to decrease the water consumption for the locality. Because of the great complexity of these considerations and the probability that the use of water in the centers of population will approximate that on an equal area of agricultural land, the future water requirements of large areas for both agricultural and domestic purposes, may best be estimated as the irrigation requirements of the net area which will eventually be irrigated, plus the areas of the cities, towns and villages of the ultimate development.

TABLE 3. PORTION OF AGRICULTURAL AREAS THAT REQUIRE A WATER SUPPLY.

Agricultural areas.	Gross area within the district boundaries. Acres.	Land that will not require water being absolutely unfit for irrigation. Acres.	Irrigable areas occupied by improvements outside of population centers. Acres.	Net area requiring a water supply. Acres.	Net Area requiring a water supply in per cent of gross area.
VALLEY FLOOR AREAS.					
Consolidated Irrigation District.....	151,500	3,000	7,425	141,075	93
Fresno Irrigation District.....	215,205	9,730	11,770	193,705	90
Mered Irrigation District.....	190,000	10,000	9,400	170,600	90
Turlock Irrigation District.....	178,665	9,100	8,900	160,665	90
Modesto Irrigation District.....	81,183	7,183	3,700	70,300	86
Orland Project, U. S. R. S.....	26,597	4,823	1,800	19,974	75
Imperial Irrigation District.....	603,840	88,840	25,750	489,250	81
James Irrigation District.....	27,260	5,260	1,100	20,900	77
Glenn-Colusa Irrigation District.....					
Jacinto Irrigation District.....					
Provident Irrigation District.....	167,685	18,400	7,400	141,885	85
Compton-Delevan Irrigation District.....					
Maxwell Irrigation District.....					
Williams Irrigation District.....					
South San Joaquin Irrigation District.....	71,112	11,000	7,112	53,000	75
INTERMEDIATE AREAS.					
Oakdale Irrigation District.....	74,246	12,000	3,110	59,136	80
Waterford Irrigation District.....	16,040	4,940	550	10,550	66
FOOTHILL AREAS.					
Fairoaks Irrigation District.....	4,000	800	160	3,040	76
Happy Valley Irrigation District.....	18,210	4,000	710	13,500	74
Nevada Irrigation District.....	208,360	76,803	6,250	125,307	60

To aid in estimating future total water requirements, Table No. 3, "Portion of Agricultural Areas That Require a Water Supply," has been prepared. This table lists the projects on which information was obtained, on the gross area, areas unfit for irrigation, and areas of irrigable land devoted to other purposes than agriculture or urban development.

Of the projects listed in the table, the Consolidated Irrigation District and the Fresno Irrigation District, illustrate the segregations of land that prevail on the flat valley floors of the state. Formed in the early days, to include lands requiring the least expenditure for development, their project boundaries enclose a greater proportion of tillable land that is suited to irrigation than do projects that were organized later. In the Consolidated Irrigation District, but 2 per cent of the gross area is unfit for irrigation and 4 per cent in the Fresno Irrigation District is deductable for the same reason. Deducting with these, the area occupied by improvements, leaves 93 per cent and 90 per cent for the Consolidated and Fresno districts, respectively, as the per cent of the gross area in these projects requiring irrigation waters. The percentages applying to these projects represent the maximum irrigable area within project boundaries when they are of appreciable size, and include the lands that are the more readily developed.

The conditions obtaining on the South San Joaquin Irrigation District are those on land comprised within a district formed within the past decade. The areas included are more or less residual lands, remaining after other projects had been organized. Here 15 per cent of the gross area is unsuited to irrigation, and but three-fourths of the land within the project boundaries require an irrigation water-supply. Of recent organization, this district is made up of a greater proportion of unirrigable land, and the percentages found approach closely to the lower limit of irrigable lands within the boundaries of projects located upon California's flat valley floors.

Between the valley floor and the foothills proper are lands, the character of which is represented by conditions on the Waterford Irrigation District. Of this district, comprising 16,000 acres, one-third is deductable as land unsuited to irrigation. Similarly located, on the transitional regions between valley floor and foothill slope, the Oakdale Irrigation District, comprising 74,200 acres, has 12,000 acres, or one-sixth of its gross area unfit for irrigation. These two projects, analogously located, mark the extremes of the per cent of these areas that require accessory waters. Oakdale, with the greater proportion of good land, can utilize irrigation waters on 80 per cent of the area within its boundaries, while Waterford, including more of the residual lands, left after other districts had been formed, requires water for but 66 per cent of its area.

The Nevada Irrigation District, in the foothills of Nevada County, comprises lands that extend from 300 feet to 3,900 feet above sea level, and includes within the 208,000 acres of this project, the upper margin of the sloping lands that are susceptible to irrigated agriculture. In this district, 37 per cent of the lands are unfit for irrigation, and but 60 per cent of the entire area within the project boundaries will require

irrigation waters. The segregation of lands in this district illustrates the condition obtaining on a foothill project of extensive area and probably is representative of the projects located in such regions.

Considering that the projects here listed were organized to include the better agricultural lands and that the remaining areas of the state have a greater proportion of poor land, it may be concluded that the segregations found, are more favorable to high percentages of irrigable land than in districts formed in the future and the net area requiring irrigation waters, of the gross irrigable area of California, will be less than the mean of the percentages found listed in the tabulation.

CHAPTER VII.

ENDURABLE DEFICIENCIES IN AN IRRIGATION SUPPLY.

Many communities, dependent upon irrigation for their prosperity, have successfully endured the shortcomings of a deficient water supply. The plants grown in the farming communities that have endured these deprivations, do not progress to a harvest stage of equal bearing as compared to plants that have been adequately supplied with moisture. Shortages of water, while inimical to the best needs of the plant through retarding growth and reducing the fruits, are not conditions, the consequences of which cause the plant to immediately languish and die.

There is a certain indefiniteness about the necessity, in both time and amount, in the practical application of irrigation waters, and, through the physical agencies at work and the resourcefulness of the plant, a scarcity of soil moisture does not lead to corresponding diminution of the harvest. A full irrigation supply furnishes much more water to the soil than is needed for plant growth. The excess water applied to the soil disappears through evaporation from the moist ground surface, and through percolation to depths beyond the reach of the plant roots. The division of the applied water between that used by the plant, and that not directly aiding in plant growth, is circumstantial, so that a reduction in the amount of applied water does not necessarily mean a corresponding reduction in the amount of water obtained by the growing plants. The manner of spreading the applied water, the time period through which the application is made, the weather conditions, and the dryness of the soil at the time of irrigation, all affect the relative division of water applied between that immediately supporting plant growth and that aiding indirectly by supplying the water necessary for dissipation by evaporation and percolation.

The manner of applying water and the time period of application, can both be changed to effect a smaller proportion of losses by increasing the expense of applying the water. Even the dryness of the soil can be mitigated by increased expense for cultivation of the soil surface. Thus by the expenditure of more money than usual, the actual water reaching the growing plants may not have to be particularly reduced, although there is an acute shortage in the total water customarily applied. The avoidable losses can be much reduced through more extended preparation of the land previous to irrigating, and by the expenditures of adequate sums in the construction of pipe conduits, lined ditches and channels for the conveyance of water to the land, and for the distribution and application of the irrigation water to the crops.

With such conservation aided by the elastic ability of growing plants to sustain life and to function under less than the most favorable conditions, the seriousness of partial shortages in irrigation supplies is removed. Periods of drought that occur only once in several years,

while effective in reducing the yield, are transitory in effect and do not have the destructive results in the irrigated areas, which a continued shortage of water would have.

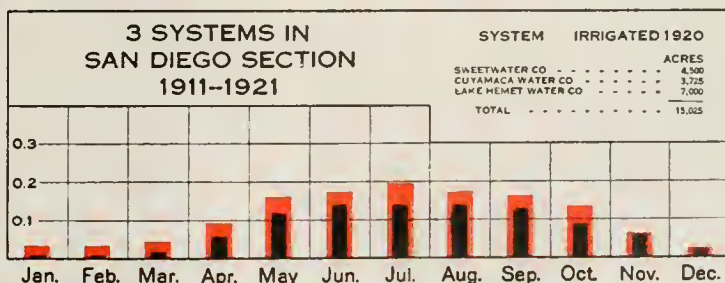
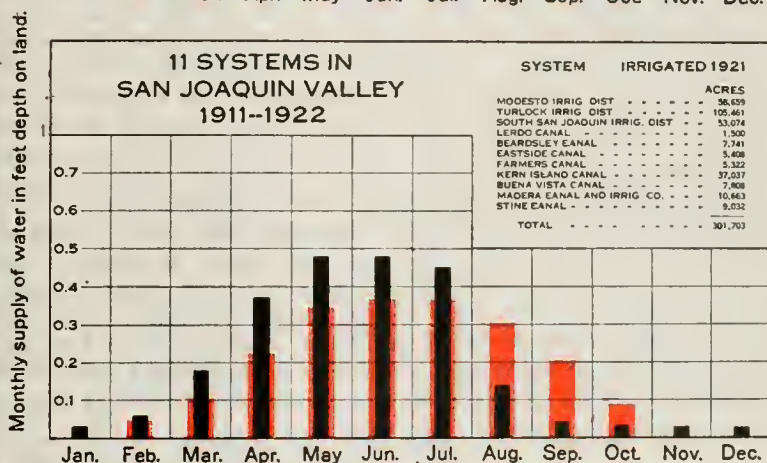
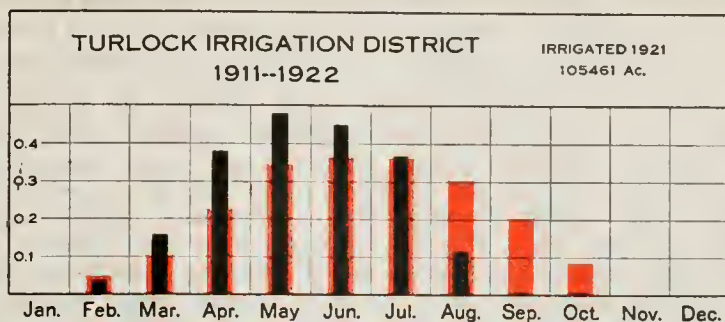
Plate II, "Average Deficiency in Irrigation Supply Endured by Successful Enterprises," presents in graphical form the distributions of water that have actually been made, and the desirable proportioning of a full water supply between the months of the year, and by the difference obtained through comparison, the deficiencies endured on several projects appear. The diagram is divided into months, January to December, each month having an equal space. In these spaces black bars have been drawn upwardly from the base line to give a picture of the per cent of the total yearly supply that was spread upon the land in any one month. The longer lengths of these bars as they extend upwardly from their common base line, represent greater per cent of distribution for the monthly interval in which they are drawn. The numerical per cent, corresponding to any bar, is found by following the intercepted lines that are drawn across, above and parallel to the base line, to the left border, where the per cent is given in figures. In a like manner, the red bars joining the black, sometimes exceeding these in length, sometimes falling short, represent the desirable distribution.

The full supply to which the water used by these projects has been compared, is that deduced in the foregoing chapters on the duty of water and the distribution of its use throughout the year. All the data that it was possible to collect, were here assembled and analyzed to determine the irrigation requirements of all parts of the state. The average values deduced for a full supply represent desirable practice of the present day.

The upper section of Plate II, shows the average deficiency sustained by the Turlock Irrigation District, one of the oldest projects in the state, and one which has never enjoyed a full season's supply, although it is a growing and prosperous community. Similarly, the middle section of Plate II, sets forth the average deficiency in supply through the latter part of the season, sustained by eleven systems in the San Joaquin Valley which have a total irrigated area of a third of a million acres. It is seen that the heavy deficiency has been successfully endured through the latter part of the growing season by these projects, and they are generally known to be growing and prosperous.

The average figures for three projects in the San Diego section, presented on the lower part of this plate, show that shortages have been successfully endured there through the entire season. Differing from other projects that have had a copious supply available during the early summer season, these districts have prospered with a less than desirable supply during the entire year. Nevertheless, these projects are located in and are a part of a region that has had a continuous and greatly accelerated growth.

The distribution through the months, of the seasonal supply, as practiced in the various sections of the state, is shown on Plate VII, "Monthly Use of Annual Irrigation Supply." Here, as on Plate II, the black bars represent average monthly supplies used, and the desirable quantity for use during the particular month is depicted in red.



AVERAGE DEFICIENCY IN IRRIGATION SUPPLY ENDURED BY SUCCESSFUL ENTERPRISES

AVERAGE MONTHLY SUPPLY USED
DESIRABLE MONTHLY SUPPLY

STATE DEPARTMENT OF PUBLIC WORKS
DIVISION OF ENGINEERING AND IRRIGATION
CALIFORNIA WATER RESOURCES INVESTIGATION
CHAPTER 889--1921 STATUTES

As this plate shows, the supply has been deficient in nearly every section of the state during the latter part of the summer. In many of the sections experiencing these deficiencies, a large amount of water was applied to the land during the fore part of the summer when there was ample flow in the streams, apparently in an endeavor to store soil moisture for the anticipated shortage of the latter portion of the season. Not only have there been shortages during the latter part of the season in many of the large projects, but, during the years of extreme drought and consequently reduced stream flow, many of the districts have been extremely short in total seasonal supply. During the shortage of 1920 in the Sacramento Valley, when there were 215,000 acres under irrigation from the main channel of the Sacramento River, much of this in rice, the amount of water was decreased twenty-four per cent compared to previous seasons, during the critical portion of the summer, without any damage to the crops.¹ In other sections of the Sacramento Valley, where the 1920 shortage was more acute, the use was decreased more than fifty per cent, without damage to fruits and cultivated crops and with little permanent damage to alfalfa. Such facts are conclusive that the supplies, deducted for the various sections of the state in Chapter V, provide a more favorable supply, more advantageously distributed through the season, than these districts at present enjoy. Such full supplies would furnish irrigation water in more ample quantities than many of the most prosperous irrigated sections of the state have ever had, and such supplies for every season, including years of greater drought, would afford more advantageous conditions than those under which all but the most favored of communities in the state have lived and prospered.

¹Report of water master of Emergency Water Conservation Conference on file in the office of Division of Engineering and Irrigation.

TABLE 4. PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of annual precipitation record.	Fifty year mean seasonal precipitation
Number.		Feet.	Years.		Loches.	Loches.
1	Fort Bidwell.....	4,640	36	1867-1921†	18.31	17.20
2	Cedarville.....	4,675	27	1894-1921	13.13	14.70
3	Alturas.....	4,460	15	1904-1919	12.34	14.20
4	Madeline.....	5,270	13	1908-1921	14.60	17.50
5	Clear Lake (Modoc County).....	4,533	2	1907-1909	13.54	15.38
6	Pittville.....	3,600	2	1908-1910	18.60	20.68
7	Fort Crook.....	3,381	12	1857-1869	22.83	20.74
8	Madroel.....	4,258	8	1907-1915	13.96	13.10
9	Horabrook.....	2,154	28	1888-1916	14.74	13.60
10	Montague.....	2,450	30	1888-1921†	12.26	11.60
11	Yreka.....	2,625	40	1872-1921†	17.57	18.10
12	Edgewood.....	2,955	22	1888-1915†	20.34	19.14
13	Sisson.....	3,555	32	1889-1921	36.56	35.20
14	Berryvale (Sisson).....	3,555	2	1881-1883	28.76	38.34
15	McCloud.....	3,270	10	1911-1921	46.72	50.00
16	Dunsmuir.....	2,285	32	1889-1921	53.82	51.80
17	Scott Valley.....	2,798	18	1871-1889	24.58	27.81
18	Fort Jones.....	2,570	33	1859-1892	25.24	23.70
19	Walla Walla Creek.....	2,570	34	1853-1892†	25.32	30.60
20	Happy Camp.....	1,132	6	1915-1921	41.64	45.77
21	Gilta.....	3,300	5	1910-1915	53.24	47.90
22	Orleans.....	520	18	1903-1921	50.00	46.80
23	Fort Gaston.....	397	25	1861-1891†	50.45	50.27
24	Monumental.....	3,420	5	1905-1910	109.08	109.70
25	Crescent City.....	50	30	1885-1921†	75.95	75.70
26	Christmas Prairie.....	3,000	2	1884-1886	78.92	77.35
27	Eureka.....	64	34	1887-1921	42.52	43.37
28	Fort Humboldt.....	50*	7	1859-1866	33.57	32.33
29	Rohnerville.....	75	19	1901-1920	42.86	43.85
30	Hydesville.....	400	1	1883-1884	34.06	45.40
31	Upper Mattole.....	244	33	1887-1921†	85.04	86.11
32	Shively.....	200	9	1912-1921	51.86	54.04
33	Dyerville.....	250	4	1907-1911	54.63	58.15
34	Blockshurg.....	1,700	11	1905-1916	67.37	63.10
35	Zenia.....	2,960	5	1901-1906	78.63	64.60
36	Ruth.....	2,925	9	1912-1921	49.15	51.20
37	Hayfork.....	2,300	6	1915-1921	29.21	32.11
38	Hyampom.....	1,200	1	1914-1915	51.53	44.79
39	China Flat.....	600	12	1909-1921	45.92	46.50
40	Big Bar.....	1,440	7	1914-1921	35.06	37.12
41	Weaverville.....	2,162	31	1871-1921†	37.81	39.20
42	Knob.....	2,860	2	1908-1910	57.90	50.58
43	Tehama.....	220	44	1872-1916	20.53	20.30
44	Los Molinos.....	215	2	1910-1912	16.74	19.57
45	Red Bluff.....	307	44	1877-1921	25.19	24.70
46	Rosewood.....	865	10	1894-1904	26.94	25.26
47	Anderson.....	432	4	Broken	33.61	37.79
48	Churn Creek.....	550	6	1915-1921	26.22	31.41
49	Shasta.....	1,049	17	1895-1912	53.80	51.20
50	Sims.....	565	4	1889-1893	70.88	61.90
51	Redding.....	552	46	1875-1921	38.52	37.70
52	Kennett.....	730	14	1907-1921	63.35	66.30
53	Delta.....	1,138	39	1882-1921	63.93	64.00
54	Montgomery Creek.....	2,500	11	1908-1919	54.08	54.60
55	Burey.....	3,300	8	1910-1918	26.41	27.28
56	Round Valley.....	5,500	12	1909-1921	77.62	88.08
57	Humburg Valley.....	4,300	4	1917-1921	40.54	54.55
58	Butt Valley.....	4,020	7	1903-1910	53.74	45.41
59	Canyon Dam.....	4,570	6	1915-1921	35.05	43.92
60	Nevis.....	4,304	2	1911-1913	23.98	35.26
61	Chester.....	4,550	11	1910-1921	29.06	33.25
62	Greenville.....	3,600	20	1894-1914	43.66	39.70
63	Susanville.....	4,195	28	1889-1918†	20.70	21.90
64	Staadish.....	4,000	3	1917-1920	8.98	14.49
65	Long Valley.....	4,400	4	1909-1913	10.97	13.06

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in order of numbers on map, Plate IV.**For alphabetical list see Table 5.*

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
66	Beckwith.....	5,005	1	1908-1909	28.05	20.62
67	Portola.....	4,900	6	1915-1921	13.66	17.12
68	Sierraville.....	5,000	12	1909-1921	23.12	26.20
69	Hobart Mills.....	5,900	6	1909-1915	25.65	24.70
70	Boca.....	5,531	44	1870-1916†	21.05	21.10
71	Truckee.....	5,819	50	1870-1921	26.13	26.50
72	Summit.....	7,017	50	1871-1921	46.38	46.38
73	Tahoe.....	6,230	11	1910-1921	31.11	32.41
74	McKinney.....	6,225	5	1910-1915	37.06	35.80
75	Colfax.....	2,421	51	1870-1921	47.81	48.20
76	Iowa Hill.....	2,825	31	1879-1910	52.63	50.10
77	Strawberry Flat.....	2,825	23	1879-1902	51.08	50.55
78	Gold Run.....	3,222	20	1899-1919	51.09	49.30
79	Towle.....	3,704	30	1885-1920†	57.36	56.40
80	Alta.....	3,704	13	1871-1884	44.86	45.63
81	Blue Canon.....	4,695	22	1899-1921	66.17	64.60
82	Drum Forebay.....	4,563	5	1916-1921	49.31	57.75
83	Deer Creek.....	3,700	14	1907-1921	68.07	73.90
84	North Bloomfield.....	3,200	43	1870-1921†	53.98	54.60
85	Malakoff Mine.....	3,200	2	1886-1896†	59.94	60.53
86	Emigrant Gap.....	5,230	41	1870-1921†	52.91	54.50
87	Cisco.....	5,939	46	1870-1916	50.57	50.90
88	Fordyce Dam.....	6,500	27	1894-1921	68.43	67.80
89	Lake Spaulding.....	4,600	27	1894-1921	70.25	69.60
90	Downville.....	3,150	13	1908-1921	63.55	67.80
91	Bowmans Dam.....	5,500	39	1871-1915†	74.38	73.00
92	La Porte.....	5,000	25	1894-1921†	76.62	77.50
93	Quincy.....	3,400	26	1895-1921	42.14	42.00
94	Edmantou.....	4,750	13	1882-1905	73.28	66.50
95	Mumford Hill.....	4,750	19	1876-1902†	71.64	68.37
96	Inskip.....	4,975	14	1907-1921	80.08	88.50
97	West Branch.....	3,216	14	1907-1921	72.35	80.00
98	Stirling City.....	3,525	14	1903-1917†	75.85	70.50
99	De Sable.....	2,500	17	1904-1921	67.37	69.20
100	Magalia.....	2,321	13	1904-1917	85.24	81.50
101	Stanwood.....	2,140	13	1903-1920†	67.66	65.10
102	Las Plumas.....	560	6	1915-1921	40.78	51.15
103	Cherokee Reservoir.....	1,200	6	1873-1879	60.32	65.18
104	Cherokee.....	1,227	13	1871-1884	42.37	43.22
105	Centerville.....	490	6	1915-1921	38.22	47.91
106	Oroville.....	250	36	1883-1921	28.03	27.70
107	Palermo.....	213	23	1891-1914	23.98	22.00
108	Serriterre.....	629	1	1920-1921	39.96	38.04
109	Woodleaf.....	3,250	4	1905-1909	93.95	76.35
110	Camptonville.....	3,500	14	1907-1921	68.17	74.00
111	Head Dam.....	1,500	14	1907-1921	54.23	58.80
112	Dobbins.....	1,650	17	1904-1921	43.76	44.70
113	North San Juan.....	2,130	6	1896-1902	48.86	51.86
114	Colgate.....	700	12	1907-1921†	42.77	45.00
115	Chute Camp.....	1,300*	14	1907-1921	54.27	58.76
116	Nevada City.....	2,580	57	1864-1921	53.89	52.21
117	Grass Valley.....	2,090	46	1873-1921†	53.00	52.80
118	Smartsville.....	600	9	1871-1880	33.12	32.41
119	Wheatland.....	81	29	1887-1916	22.21	21.30
120	Marysville.....	67	50	1871-1921	19.71	19.71
121	West Butte.....	100	4	1880-1914	14.17	17.89
122	Gridley.....	97	10	1907-1917	22.31	21.90
123	Biggs.....	98	17	1899-1916	22.20	20.00
124	Dodgeland.....	160	1	1920-1921	24.61	18.50
125	Durham.....	160	24	1895-1919	24.96	24.00
126	Chico.....	189	50	1871-1921	23.78	23.78
127	Corning.....	277	34	1880-1916†	20.59	19.90
128	Orland.....	254	38	1883-1921	18.02	17.50
129	Saint John.....	143	1	1920-1921	24.59	18.48

*Estimated

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
130	Jacinto.....	110	8	1892-1900	19.57	18.69
131	Willows.....	136	42	1879-1921	16.65	16.60
132	Princeton.....	80	11	1873-1884	14.94	16.40
133	Colusa.....	60	40	1871-1921†	16.12	16.40
134	Williams.....	89	8	1876-1884	12.17	14.15
135	Fruto.....	624	22	1889-1911	21.67	19.50
136	Little Stony.....		1	1885-1886	26.82	21.44
137	East Park.....	1,200	10	1911-1921	16.98	17.30
138	Fouts Springs.....	1,650	9		36.16	35.72
139	Kono Tayee (Lakeport).....	1,325	20	1874-1904†	23.16	24.40
140	Lakeport.....	1,325	21	1870-1921†	22.77	23.60
141	Upper Lake (Lake County).....	1,325	28	1886-1914	28.25	26.80
142	Hullville.....	2,250	14	1907-1921	51.23	52.30
143	Covelo Ranger Station.....	1,550	16	1881-1918†	35.69	40.40
144	Camp Wright.....		11	1864-1875	44.01	40.82
145	Hearst.....	1,800	5	1910-1915	51.93	52.35
146	Willits.....	1,364	29	1878-1907	55.91	54.90
147	Ukiah.....	620	44	1877-1921	36.82	36.40
148	Mendocino.....	50*	13	1871-1884	50.69	51.20
149	Fort Bragg.....	74	21	1861-1921†	38.66	41.67
150	Westport.....	50*	1	1885-1886	52.07	35.20
151	Branscombe.....	2,000	21	1900-1921	85.25	82.40
152	Laytonville.....	1,600	7	1904-1911	62.46	57.50
153	Point Arena.....	50*	9	1875-1884	30.49	30.32
154	Cloverdale.....	340	21	1893-1921†	41.73	39.60
155	Cloverland.....	100	45	1875-1921†	53.87	53.20
156	Point Reyes.....	490	38	Broken	20.98	20.60
157	Farallones Light House.....	50*	1	1885-1886	26.15	20.24
158	South East Farallon.....	10	19	1894-1913	18.03	19.18
159	Peachland.....	190	25	1896-1921	41.11	41.40
160	Healdsburg.....	52	44	1877-1921	41.84	41.40
161	Highland Springs.....		3	1883-1886	33.43	36.06
162	Twin Valley.....	2,200	6	1915-1921	42.28	47.32
163	Sulphur Banks.....	1,350	8	1911-1919	22.99	23.43
164	Middletown.....	1,300	11	1879-1896†	48.04	49.31
165	Helen Mine.....	2,750	21	1900-1921†	87.67	83.00
166	St. Helena Mt.....	2,300	10	1901-1911	63.87	57.40
167	Calistoga.....	363	48	1873-1921	36.50	36.50
168	Santa Rosa.....	181	33	1888-1921	30.38	29.40
169	Petaluma.....	10	29	1874-1921†	23.93	24.20
170	South Vallejo.....	55	30	1872-1884	14.55	15.33
171	Benicia.....	27	7	Broken	14.87	14.41
172	Martinez.....	15	13	1877-1884	17.94	18.06
173	Fairfield (Suisun).....	275	36	1871-1884	19.70	20.28
174	Okell.....	60	41	1884-1920	30.36	30.12
175	Imola.....	20	41	1877-1921†	23.66	23.40
176	Napa City.....	30	17	1877-1921†	23.66	23.40
177	Sonoma.....	153	17	1886-1907†	28.46	26.50
178	Oakville.....	255	13	1907-1914	33.29	34.19
179	St. Helena.....		1	1908-1921	35.42	37.00
180	Knoxville.....		1	1883-1884	34.53	32.29
181	Rumsey.....	2,629	5	1888-1893	31.90	27.36
182	Guinda.....	350	20	1896-1916	21.92	21.00
183	Dunnigan.....	65	39	1877-1916	20.27	19.70
184	Nicolaus.....	33	1	1920-1921	19.53	17.75
185	Knights Landing.....	45	25	1878-1903	18.36	18.30
186	Woodland.....	63	48	1873-1921	17.49	17.50
187	Davis.....	51	49	1872-1921	17.04	17.10
188	Winters.....	132	1	1885-1886	25.40	19.85
189	Vacaville.....	175	37	1880-1917	27.04	26.37
190	Rio Vista.....	35	24	1893-1921†	17.87	17.30
191	Benson's Ferry.....	40*	3	1918-1921	14.19	15.47

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in order of numbers on map, Plate IV.**For alphabetical list see Table 5.*

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
192	Lodi.....	35	24	1888-1912	19.46	17.90
193	Bellota.....	150	10	1911-1921	17.64	20.07
194	Galt.....	49	42	1878-1921†	18.26	18.10
195	Brighton.....	42	7	1877-1884	16.95	14.79
196	Sacramento.....	71	72	1849-1921	18.72	18.60
197	Folsom.....	252	50	1871-1921	24.37	24.40
198	Represa.....	305	28	1893-1921	25.95	25.44
199	Rocklin.....	249	48	1871-1921†	22.01	22.40
200	Newcastle.....	970	14	1892-1910†	34.27	29.70
201	Auburn.....	1,360	50	1871-1921	33.72	33.70
202	Wire Bridge.....	565	8	1894-1902	35.09	34.22
203	Georgetown.....	2,650	46	1873-1921†	57.92	57.30
204	Pilot Creek.....	4,000	20	1894-1914	69.21	65.90
205	Mundy's.....	4,300	2			63.10
206	Placerville.....	1,875	43	1874-1921†	42.65	42.50
207	El Dorado.....	1,609	13	1889-1902	36.81	34.60
208	Shingle Springs.....	1,415	35	1888-1912†	33.72	34.10
209	Oleta.....	1,510	10	1892-1902	36.22	32.63
210	Drytown.....	790	12	1893-1906†	29.90	26.70
211	Ione.....	287	43	1878-1921	20.39	20.20
212	Jackson.....	1,900	10	1893-1903	35.16	32.38
213	Kennedy Mine.....	1,500	29	1892-1921	32.14	30.90
214	Mill Creek No. 1.....	2,450	14	1907-1921	44.42	48.00
215	Electra.....	725	17	1904-1921	32.44	32.70
216	Mokelumne Hill.....	1,550	36	1882-1918	31.93	31.00
217	San Andreas.....	445	44	1871-1915	42.87	42.10
218	Valley Springs.....	673	26	1888-1915†	24.37	22.50
219	Jenny Lind.....	300	14	1907-1921	18.13	19.65
220	Milton.....	381	33	1888-1921	21.56	20.70
221	Angels Camp.....	1,535	7	1908-1915	35.80	35.76
222	Melones.....	775	14	1907-1921	28.25	30.59
223	Phoenix Dam.....	2,500	7	1909-1916	29.91	30.09
224	Penstock Camp.....	3,750	3	1907-1910	37.31	39.82
225	Long Camp.....	4,100	1	1909-1910	43.72	44.61
226	American Camp.....	2,300	1	1915-1916	47.80	50.84
227	Calaveras River.....		4	1916-1920	40.23	49.70
228	Mitchell Hill.....	2,800	1	1915-1916	44.85	47.70
229	Westpoint.....	2,326	24	1894-1921†	41.85	40.20
230	Grizzly Flat.....	3,850			55.80	44.90
231	Bear River.....	5,800	7	1907-1914	48.86	52.42
232	Bear River Reservoir.....	5,680	11	1907-1918	54.38	58.79
233	Fallen Leaf.....	6,400	6	1909-1915	37.45	36.10
234	Tallac.....	6,230	4	1904-1914	26.31	25.43
235	Markleeville.....	5,525	1	1920-1921	15.02	13.53
236	Tamarack.....	8,030	18	1900-1921†	49.02	49.60
237	Shield's Ranch.....	5,300*	1	1920-1921	9.64	8.69
238	Bridgeport.....	6,500	5	1912-1917	10.82	10.51
239	Bodie.....	8,248	11	1895-1906	14.58	17.30
240	Lundy Reservoir.....	7,765	2	1919-1921	17.92	24.06
241	Laws.....	4,113	13	1883-1896	4.35	5.11
242	Bishop.....	4,450	31	1883-1918†	5.43	5.50
243	Bishop Creek.....	8,500	7	1911-1921†	14.09	15.30
244	Lake Sebrina.....	9,100	12	1909-1921	14.48	11.56
245	Hillside Reservoir.....	9,700	12	1909-1921	18.78	14.99
246	Owens Valley No. 2.....	4,070	1	1908-1909	7.27	5.01
247	Owens Valley No. 3.....	4,460	2	1908-1910	8.28	6.18
248	Owens Valley No. 4.....	5,040	2	1908-1910	9.37	6.99
249	Owens Valley No. 5.....	5,550	2	1908-1910	12.07	9.01
250	Owens Valley No. 6.....	6,190	2	1908-1910	17.17	12.82
251	Gem Lake.....	9,060	2	1919-1921	41.40	55.60
252	Huntington Lake.....	7,000	6	1915-1921	30.28	34.40
253	Cascade.....	4,900	6	1915-1921	29.48	31.09
254	Stevenson Creek.....	4,250	4	1915-1919	20.77	21.68
255	Toll House.....	2,000	3	1917-1921†	22.71	24.60

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
256	Fort Miller.....	400	4	Broken	24.51	20.56
257	Aubrey.....	1,300	5	1916-1921	23.14	25.95
258	S. J. L. and P. Co. Res. No. 1.....	2,441	16	1903-1919	26.82	25.52
259	North Fork.....	3,000	12	1904-1921†	35.52	35.90
260	S. J. L. and P. Co. P. H. No. 3.....	2,825	2	1919-1921	34.84	37.48
261	San Joaquin L. and P. Co. (Crane Valley).....	3,500	18	1903-1921	52.23	40.70
262	Buchanan.....	600	4	1878-1882	19.79	21.62
263	Summerdale.....	5,000	14	1896-1910	55.00	51.30
264	Mariposa.....	1,932	13	1908-1921	29.79	31.31
265	Glacier Point.....	7,297	1	1920-1921	29.83	27.11
266	Yosemite.....	3,945	15	1904-1921†	32.68	35.10
267	Hetch Hetchy.....	3,665	11	1910-1921	33.38	36.29
268	Lake Eleanor.....	4,700	11	1910-1921	39.57	43.00
269	Crocker.....	4,452	13	1896-1909	54.97	50.90
270	Second Garrotte.....	2,714	18	1883-1901	38.53	36.35
271	Groveland.....	1,400	8	1901-1914†	43.96	38.00
272	Jacksonville.....	650	10	1907-1917	33.90	36.05
273	Sonora.....	1,825	26	1888-1921†	33.96	32.50
274	Jamestown.....	1,471	10	1903-1913	32.67	31.48
275	Coulterville.....	1,660	4	1898-1902	19.81	18.96
276	La Grange.....	293	36	1868-1915†	16.46	16.80
277	Merced Falls.....	351	11	1907-1921†	15.87	16.20
278	Merced.....	173	49	1872-1921	11.02	11.10
279	Le Grand.....	255	21	1899-1921†	12.67	12.00
280	Central Point.....		5	1879-1884	9.28	9.67
281	Los Baños.....	121	39	1873-1913†	7.95	8.20
282	Hills Ferry.....	65	4	1880-1884	11.70	11.41
283	Livingston.....	131	1	1920-1921	12.47	10.39
284	Denair.....	126	18	1899-1921†	10.39	9.80
285	Turlock.....	105	1	1920-1921	18.82	15.65
286	Longworth.....	132	5	1881-1886	15.03	14.91
287	Oakdale.....	156	34	1881-1921†	14.27	14.00
288	Farmington.....	111	38	1877-1915	16.49	15.90
289	Stockton.....	23	54	1867-1921	14.08	14.18
290	Lathrop.....	22	6	1915-1921	10.78	12.43
291	Grayson.....	54	14	1870-1884	12.26	12.93
292	Westley.....	90	26	1888-1915†	10.70	10.00
293	Modesto.....	90	44	1871-1915	10.66	10.70
294	Newman.....	91	32	1889-1921	10.83	10.20
295	Gilroy.....	193	47	1874-1921	19.90	19.80
296	Tennant.....	323	7	1877-1884	21.96	20.51
297	Morgan Hill.....	348	9	1899-1910†	22.95	22.04
298	Laurel.....	910	25	1891-1916	49.10	48.20
299	Wrights.....	1,600	2	1918-1920	50.66	57.60
300	Los Gatos.....	600	36	1885-1921	33.09	32.80
301	Campbell.....	217	24	1897-1921	15.39	16.10
302	Santa Clara.....	90	38	1881-1921†	16.19	15.90
303	San Jose.....	95	47	1874-1921	15.11	15.10
304	Lick Observatory.....	4,209	40	1881-1921	30.60	30.00
305	S. V. W. Co. No. 110 (Upper Arroyo Valley).....		8	1913-1921	20.99	21.69
306	S. V. W. Co. No. 109 (Upper Arroyo Valley).....		8	1913-1921	18.79	19.41
307	Spring Valley Water Co. No. 108.....		8	1913-1921	11.96	12.36
308	Spring Valley Water Co. No. 105A.....		3	1918-1921	13.36	15.01
309	Spring Valley Water Co. No. 106A.....	1,800	2	1919-1921	12.82	15.64
310	Spring Valley Water Co. No. 107.....		8	1913-1921	22.87	23.61
311	Spring Valley Water Co. No. 112.....		5	1913-1921†	19.25	21.40
312	S. V. W. Co. No. 111 (Patterson Ranch).....		7	1914-1921	17.45	18.91
313	Sam Parks.....	2,500	6	1912-1918	26.09	28.10
314	Ogiers.....	2,650	6	1912-1918	27.17	30.42
315	Blanch Gage.....	2,950	6	1912-1918	22.55	24.20
316	Calaveras.....	600	41	Broken	25.19	24.71
317	Mount Day.....	3,789	6	1912-1918	26.63	28.70
318	Tequisquita Ranch.....	244	7	1899-1906	16.21	15.60

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in order of numbers on map, Plate IV.**For alphabetical list see Table 5.*

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
319	Niles.....	87	42	1871-1919†	19 05	18 70
320	Sunol.....	250	17	1898-1915	22 56	21 57
321	Pleasanton.....	361	7	1877-1884	18 94	19 07
322	Dublin.....	367	9	1909-1918	19 51	21 04
323	Weideman Ranch.....	1,500	2	1910-1913†	21 79	25 19
324	Bishop Ranch.....	425	4	1907-1911	22 26	21 71
325	Spring Valley Water Co. No. 101.....		9	1912-1921	15 82	17 23
326	Spring Valley Water Co. No. 102.....	700	9	1912-1921	15 35	16 73
327	Spring Valley Water Co. No. 103.....		8	1912-1921†	13 39	15 30
328	Alameda Sugar Co.....	346	8	1903-1911	19 02	16 85
329	Hagermao Ranch.....	350	8	1906-1914	15 55	15 58
330	Duvall Vineyard.....	4,000	7	1904-1911	18 65	16 36
331	El Mocho Vineyard.....	550	9	1902-1911	15 82	14 21
332	Livermore.....	485	50	1871-1921	15 30	15 30
333	Spring Valley Water Co. No. 104.....		8	1912-1921†	11 94	12 94
334	Midway.....	354	2	1877-1879	6 60	5 35
335	Ellis.....	73	8	1871-1879	9 41	9 11
336	Tracy.....	64	40	1879-1921†	10 13	9 80
337	Byron.....	33	5	1879-1884	12 90	13 22
338	Brentwood.....	77	5	1879-1884	11 10	11 38
339	Antioch.....	46	42	1879-1921	12 52	12 40
340	Mount Diablo.....	3,848	2	1875-1877	21 01	24 16
341	Walnut Creek.....	75	20	1887-1921†	19 82	19 26
342	Crockett.....	109	3	1918-1921	15 64	17 43
343	San Pablo Lake.....	200*	5	1916-1921	17 44	21 80
344	East Brother Island.....	245	9	1875-1884	7 54	7 82
345	San Rafael.....	2,300	10	1874-1884	39 58	41 27
346	Kentfield.....	65	33	1888-1921	48 25	46 70
347	Mount Tamalpais.....	2,375	22	1898-1920	26 80	26 80
348	Sausalito.....	5	10	1904-1914	25 48	24 10
349	Point Bonita.....	283	9	1875-1884	25 43	25 82
350	Angel Island.....	762	17	1867-1884	21 82	20 61
351	Alcatraz Island.....	130	22	1861-.....†	17 99	16 78
352	Yerba Buena Island.....	343	9	1875-1884	17 78	16 31
353	Berkeley.....	320	34	1887-1921	25 72	25 60
354	Lake Temescal.....	425	13	1908-1921	21 65	22 91
355	Lake Chabot.....	235	44	1877-1921	22 48	22 18
356	San Leandro.....	48	14	1895-1911†	23 77	22 70
357	Alameda.....	19	2	1909-1911	13 40	12 52
358	Mills College.....	200	21	1893-1916†	26 41	24 80
358A	San Francisco.....	207	72	1849-1921	22 49	22 50
359	Oakland.....	36	47		23 84	23 80
359A	Fort Mason.....	100	13	1870-1884	16 24	15 50
360	Presidio.....	150	33	1849-1884†	19 79	18 90
361	Fort Point.....	186	4	1865-1869	22 88	17 84
362	Point Lobos.....	250	21	1893-1914	18 21	18 96
363	Lake Honda.....	400	1	1920-1921	25 52	26 05
364	Lake Merced.....	19	20	1870-1921†	22 64	22 75
365	Point Montara.....	25	9	1875-1884	22 73	23 54
366	San Andreas Reservoir.....	445	13	1871-1884	48 73	51 41
367	San Mateo.....	22	47	1874-1921	20 61	20 60
368	Lewer Crystal Springs.....	300	28	Broken	30 29	29 29
369	Crystal Springs Cottage.....	300	24	1894-1918	30 09	29 42
370	Upper Crystal Springs.....	300	43	1875-1918	34 51	33 98
371	Pilarcitas.....	695	47	1871-1918	48 96	48 61
372	Woodside.....	428	2	1905-1907	37 77	28 60
373	Menlo Park.....	64	35	1878-1913	16 88	16 60
374	Portola Woods.....	370	14	1892-1906	31 12	28 52
375	Mountain View.....	95	18	1886-1910†	15 55	14 02
376	Pigeon Point.....	0	9	1875-1884	18 44	18 24
377	Ano Nueve Island.....	0	9	1875-1884	22 48	22 23
378	Boulder Creek.....	470	28	1888-1916	55 59	53 00
379	Ben Lomond.....	300	16	1899-1916†	55 55	54 40
380	Glenwood.....	885	9	Broken	44 18	45 18

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipita- tion record.	Fifty year mean seasonal precipita- tion.
Number.		Feet.	Years.		Inches.	Inches.
381	Felton.....	275	26	1899-1921†	46.88	44.70
382	Santa Cruz.....	20	43	1878-1921	27.23	27.10
383	Aptos.....	102	30	1885-1915	28.12	26.80
384	Watsonville.....	23	31	1881-1921†	21.71	21.10
385	Pajaro.....	22	11	1873-1884	18.23	19.70
386	Hollister.....	284	47	1874-1921	13.19	13.10
387	Salinas.....	40	47	1873-1921†	14.05	14.00
388	Speckels.....	43	16	1905-1921	13.98	13.20
389	Del Monte.....	25	10	1911-1921	14.90	15.50
390	Monterey.....	15	41	1847-1915†	16.25	16.30
391	Chualar.....	101	3	1881-1884	12.67	10.80
392	Big Sur.....	300	7	1914-1921	38.59	38.88
393	Gonzales.....	127	16	1899-1915	12.60	11.60
394	Soledad.....	188	45	1874-1921†	9.48	9.40
395	Abbotts.....	1,050	6	1915-1921	20.31	22.26
396	San Ardo.....	452	16	1886-1902	10.38	11.02
397	King City.....	333	32	1887-1921†	11.12	11.00
398	Priest Valley.....	2,240	19	1898-1921†	21.54	20.30
399	Coalinga.....	663	9	1912-1921	7.29	7.45
400	New Idria.....	2,500	3	1881-1884	19.43	16.65
401	Idria (New Idria).....	2,500	1	1920-1921	13.86	16.31
402	Panoche.....	1,265	5	1914-1919	8.45	7.84
403	Mendota.....	177	13	1894-1908†	6.54	6.30
404	Firebaugh.....	153	27	Broken	8.00	7.98
405	Storey.....	296	21	1899-1921†	9.63	9.40
406	Borden.....	275	9	1875-1884	8.60	8.40
407	Friant.....	345	21	Broken	13.81	14.04
408	Hamptonville.....		2	1878-1880	16.48	18.83
409	Big Dry Creek.....		8	1871-1879	16.28	18.84
410	Clovis.....	400	4	1917-1921	11.05	12.30
411	Fresno.....	293	40	1881-1921	9.78	9.60
412	Lemoore.....	226	6	1878-1884	7.91	7.54
413	Hanford.....	249	20	1899-1921†	8.40	8.50
414	Tulare.....	289	44	1876-1921†	8.39	8.40
415	Porterville.....	454	32	1889-1921	10.13	9.40
416	Lindsay.....	500*	6	1915-1921	10.33	9.56
417	Visalia.....	334	41	1877-1921†	9.89	9.60
418	Goshoe.....	300*	7	Broken	6.91	6.42
419	Traver.....		1	1886-1887	8.51	9.67
420	Kingsburg.....		6	1878-1884	8.80	8.40
421	Selma.....	311	29	1883-1915	9.11	9.00
422	Dimuba.....	333	12	1909-1921	11.95	12.13
423	Reedley.....	347	20	1911-1921	11.65	11.50
424	Surger.....	371	25	1889-1915†	10.66	10.30
425	Kings River.....		6	1878-1884	16.35	15.60
426	Piedra.....		1	1920-1921	13.65	14.37
427	Dunlap.....	2,800	4	1912-1916	29.33	26.91
428	Lemon Cove.....	600	21	1899-1921†	14.66	14.00
429	Three Rivers.....	870	11	1910-1921	19.16	19.45
430	Lewis Valley.....	600	6	1878-1884	11.15	10.96
431	Milo.....	1,600	20	1898-1921†	22.65	21.30
432	Springville.....	4,000	14	1907-1921	35.14	34.30
433	Tule River.....	2,500	8	1913-1921	37.84	36.11
434	Owens Valley No. 16.....	6,100	2	1908-1910	10.58	7.89
435	Owens Valley No. 15.....	5,500	2	1908-1910	8.72	6.50
436	Owens Valley No. 14.....	5,000	2	1908-1910	6.45	4.81
437	Owens Valley No. 13.....	4,500	2	1908-1910	4.82	3.60
438	Owens Valley No. 12.....	4,100	2	1908-1910	3.92	2.93
439	Owens Valley No. 11.....	6,120	2	1908-1910	15.05	11.23
440	Owens Valley No. 10.....	5,590	2	1908-1910	10.50	7.84
441	Owens Valley No. 9.....	5,030	2	1908-1910	8.49	6.34
442	Owens Valley No. 8.....	4,800*	2	1908-1910	7.26	5.40

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in order of numbers on map, Plate IV.**For alphabetical list see Table 5.*

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipita- tion record	Fifty year mean seasonal precipita- tion.
Number.		Feet.	Years.		Inches.	Inches.
443	Owens Valley No. 7.....	3,940	2	1908-1910	5.75	4.29
444	Camp Independence.....	3,925	12	1871-1877	4.47	4.33
445	Lone Pine.....	3,728	16	1904-1920	5.70	4.30
446	Keeler.....	3,620	24	1885-1909	3.01	3.20
447	Greenland Ranch.....	178	9	1912-1921	1.71	1.68
448	Trona.....	1,623	1	1920-1921	4.99	4.34
449	Hot Springs.....	3,300	10	1907-1917	25.65	23.50
450	Weldon.....	2,700	4	1900-1906†	9.63	7.65
451	Kernville.....	2,600	27	1894-1921	10.30	10.00
452	Glenoville.....	5,500	12	1909-1921	20.96	21.20
453	Isabella.....	2,500	13	1896-1909	10.62	10.30
454	Borel.....	2,500	10	1904-1915†	12.12	10.67
455	Edison Kero River.....	2,530	15	1904-1920†	11.48	10.50
456	Taylor's Ranch.....	2,640	2	1900-1902	9.46	8.76
457	Mojave.....	2,751	37	1877-1914	4.93	4.80
458	Tehachapi.....	3,964	37	1877-1914†	10.69	10.40
459	Tejon Ranch.....	1,500	19	1909-1921	10.52	9.78
460	Bear Valley.....	4,400	13	1900-1915†	20.02	16.00
461	Keene.....	2,721	7	1877-1884	13.79	13.27
462	Caliente.....	1,290	39	1876-1915	10.94	10.80
463	Edison.....	2,500	16	1904-1921†	11.21	9.40
464	Rio Bravo Ranch.....	550	4	1878-1882	7.53	8.84
465	Maguden Sub.....	500*			5.60	5.51
466	Sumner.....	400*	10	1874-1884	5.10	6.06
467	Oil Center.....	634	6	1914-1920	6.96	6.84
468	Thermal Heights.....		6	1914-1920	10.06	9.88
469	Vestal.....		2	1910-1913†	6.22	8.29
470	Angiola.....	208	15	1899-1921†	6.51	6.20
471	Delano.....	319	32	1876-1908	6.38	6.60
472	Poso Ranch.....		19	1901-1920	6.25	5.44
473	Wasco.....	336	18	1899-1921†	6.43	5.40
474	Rosedale Ranch.....	373	7	1913-1920	6.42	5.42
475	Bakersfield.....	394	31	1889-1921†	5.58	5.20
476	Stockdale.....	369*	19	1901-1920	6.08	5.29
477	McClung Ranch.....	300*	3	1879-1882	5.04	6.86
478	Lakeside Ranch.....	320*	19	1901-1920	5.40	4.70
479	San Emidio.....		19	1901-1920	9.62	8.38
480	Maricopa.....	640	10	1911-1921	6.20	5.58
481	Middlewater.....	803	10	1911-1921	6.31	5.68
482	Dudley.....	595	9	1912-1921	6.80	5.96
483	Antelope Valley.....	1,205	9	1912-1921	9.36	9.56
484	Parkfield.....	2,800	11	1908-1921†	17.64	16.80
485	San Miguel.....	616	28	1887-1915	11.84	11.60
486	Jolon.....	960	37	1882-1921†	18.09	17.70
487	Paso Robles.....	800	34	1887-1921	16.35	16.30
488	Atascadero.....	837	5	1916-1921	17.49	18.21
489	Santa Margarita.....	996	27	1889-1916	28.32	27.40
490	San Luis Obispo.....	201	52	1869-1921	21.27	21.62
491	Santa Maria.....	220	30	1885-1921†	14.16	14.20
492	Betteravia.....	150	8	1913-1921	15.12	14.49
493	Lompoc.....	95	3	1918-1921	11.73	14.42
494	Point Conception.....	100*	8	1876-1884	11.78	11.99
495	San Miguel Island.....	500	23	1894-1921†	13.40	13.50
496	Los Alamos.....	569	12	1909-1921	17.29	15.31
497	Sisquoc Ranch.....	600	10	1904-1914	19.92	17.60
498	Wasioja.....	2,393	7	Broken	16.34	15.55
499	Pine Crest.....	1,000	17	1898-1916†	27.95	25.30
500	Santa Barbara.....	130	54	1867-1921	18.54	18.82
501	Ventura.....	50	35	1873-1909†	15.94	16.50

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
502	Hueneme.....	8	11	1873-1884	14.59	14.99
503	West Saticoy.....	150	19	1893-1916†	14.72	15.10
504	Santa Paula.....	286	18	Broken	15.87	16.50
505	Ojai Valley.....	900	16	1905-1921	23.87	20.60
506	Nordhoff.....	1,200			19.15	23.06
507	Mono Ranch.....	1,250*	13	1901-1914	34.24	29.28
508	Ozena.....	3,680	15	1904-1921†	17.10	15.80
509	Pattinway.....	3,750	6	1915-1921	10.59	9.90
510	Mutah Flat.....	4,850	9	1893-1902	13.99	20.05
511	Upper Lake.....	1,350	28	1886-1914	28.25	26.80
512	Frazier Mice.....	7,200	2	1895-1897	19.77	22.99
513	Fort Tejon.....	3,174	8	Broken	13.91	14.67
514	Smith's Ranch.....	3,500*	2	1899-1901	6.93	9.62
515	La Libre.....	3,170	1	1898-1899	5.35	10.48
516	Manzana.....	2,800	9	1894-1903	7.57	9.73
517	Monterio.....	4,500	13	1899-1912	17.87	18.00
518	Fairmont.....	3,047	8	Broken	13.36	14.66
519	Lancaster.....	3,000	1	1917-1918	6.25	7.53
520	Little Rock Creek.....	3,000	1	1920-1921	10.33	10.23
521	Ravenna.....	2,468	5	1879-1884	11.28	9.10
522	Acton.....	486	1	1919-1920	9.78	9.88
523	Magic Hill.....	2,820	1	1899-1900	14.15	24.40
524	Pinchot.....	1,200*	3	1909-1912	16.98	15.20
525	Newhall.....	1,268	38	1877-1915	17.87	17.50
526	San Fernando.....	1,066	26	1877-1921†	14.16	13.91
527	Santa Monica.....	110	36	1885-1921	14.99	14.40
528	Los Angeles.....	361	44	1877-1921	15.50	15.20
529	Pasadena.....	827	22	1892-1921†	18.52	19.08
530	La Crescenta.....	2,069	3	1918-1921	21.49	24.70
531	Tujunga.....	1,400	1	1920-1921	23.39	23.15
532	May Canyon.....	1,650	2	1919-1921	20.31	20.31
533	Haines Canyon.....	2,400	3	1918-1921	28.82	33.12
534	Bryant's Ranch.....	1,800*	1	1920-1921	21.33	21.12
535	Lower Haines.....	2,000	3	1918-1921	24.87	28.60
536	Hansen Ranch.....	1,800*	2	1919-1921	29.27	29.27
537	Palmdale.....	3,299	6	1896-1902	6.90	9.79
538	Alder Creek.....	3,500	3	1918-1921	18.28	21.02
539	Echo Mountain.....	4,016	3	1918-1921	23.09	26.53
540	Arroyo Seco.....	2,000	3	1918-1921	19.26	22.13
541	Sister Elsie Peak.....	5,081	3	1899-1919†	21.83	21.50
542	Colby Camp.....	3,875	3	1899-1902	20.88	20.72
543	Mt. Lowe Observatory.....	3,420	21	1896-1919†	27.50	28.90
544	Mount Wilson.....	5,850	17	1904-1921	33.30	31.80
545	Santa Anita Forest Station.....	1,500*	1	1920-1921	37.92	37.55
546	Sierra Madre.....	1,400	24	1897-1921	24.22	25.70
547	Monrovia Canon.....	900*	3	1918-1921	23.72	27.26
548	Burkhart Ranch.....	400*	14	1905-1919	18.10	17.45
549	Azusa.....	540	22	1898-1920	19.63	20.40
550	Glendora.....	740	11	1892-1911†	23.66	23.20
551	Alosta.....	750	4	1880-1884	27.90	23.03
552	Fish Canyon.....	1,000*	3	1918-1921	20.76	23.87
553	San Gabriel Power House.....	1,000*	4	1900-1921†	19.21	20.55
554	O'Melveny Camp.....	1,000*	1	1920-1921	27.22	26.96
555	Two Canyon Ranch.....	1,200*	1	1920-1921	22.95	24.69
556	San Gabriel Intake.....	1,200*	3	1918-1921	23.23	26.72
557	Follows Camp.....	1,800	3	1896-1899	22.55	35.42
558	Stanley Miller Mine.....	4,000*	2	1919-1921	30.60	30.60
559	Valeremo.....	3,700*	10	1911-1921	11.35	11.55
560	Llano.....	3,200*	3	1918-1921	6.46	7.43
561	Voltaire.....	3,000*	1	1920-1921	17.06	16.89
562	San Antonio Canyon.....	4,150	3	1918-1921	28.68	32.98
563	Mouth, San Antonio.....	2,300	3	1918-1921	21.60	24.81
564	Mountain Springs.....	2,750*	2	1919-1921	25.17	25.17
565	Claremont.....	1,200	30	1891-1921	18.10	19.30
566	Live Oak Canyon.....	1,350	3	1918-1921	17.38	19.96
567	Pomona.....	861	8	1913-1921	19.43	18.70
568	Sodra.....	711	10	1874-1884	12.51	11.65
569	Chino.....	714	22	1893-1915	15.71	16.30

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
570	Upland.....	1,750	20	1891-1911	21 00	23.10
571	Lordsburg.....	1,320	14	1904-1918	21 00	19.40
572	Rancho Del Jurupa.....	1,000	1	1882-1883	16 11	29.85
573	Fontana.....	1,325	6	1915-1921	17 90	17.90
574	Colton.....	978	8	1876-1884	9 77	9.97
575	San Bernardino.....	1,054	51	1870-1921	16 11	16.15
576	Redlands.....	1,352	32	1889-1921	14 64	14.70
577	Craftonville.....	1,759	17	1892-1909	14 10	14.90
578	Squirrel Inn.....	5,280	10	Broken	40 05	41.34
579	Mill Creek No. 2.....	2,950	18	1903-1921	24 36	23.00
580	Santa Ana River.....	2,850	17	1904-1921	29 73	27.48
581	Arrowhead Springs.....	2,000	7	1909-1919†	24 30	22.70
582	Morse's House.....	5,350	5	1893-1898	43 74	51.40
583	Deep Creek.....	5,200	5	1893-1898	24 61	28.90
584	Bear Valley Dam.....	6,500	22	1892-1918†	35 96	36.40
585	Devils Canon.....	2,000	3	1912-1915	25 68	22.72
586	Lytle Creek.....	2,250	16	1905-1921	38 40	36 03
587	Glen Ranch.....	3,256	16	1800-1916	35 40	32.90
588	Devore Ranch.....	3,256*	2	1919-1921	37 58	36.82
589	Dobie Ranch.....	3,300	11	Broken	5 89	4.91
590	Gray Mountain.....	3,000	2	1915-1917	4 65	4 64
591	Barstow.....	2,105	24	Broken	4 26	3.90
592	Daggett.....	2,006	1	1883-1884	3 98	2.15
593	Camp Cady.....		1	1868-1869	3 87	3.01
594	Holcomb.....	7,800	7	1909-1916	19 72	18 00
595	Holcomb Creek.....	5,220	3	1895-1898	13 63	17.80
596	Big Bear Tavern.....	6,800*	2	1919-1921	21 78	21.35
597	Seven Oaks.....	5,000	10	1911-1921	28 26	27.60
598	Converse Nursery.....	6,000	2	1915-1917	32 19	27.16
599	Raywood Flat.....	6,500	3	1918-1921	28 75	29.75
600	Rings Station.....	4,300	8	1874-1882	22 49	25.40
601	Red Dome.....	2,835	1	1920-1921	17 41	18.72
602	Mission Valley.....	2,350	3	1919-1921	11 37	10.88
603	Morongo Valley.....	2,500	3	1918-1921	8 71	8.33
604	Rose Mine.....	6,867	2	1919-1921	13 72	13.13
605	Bagdad.....	784	18	1903-1921	2 17	1.90
606	Fenner.....	2,091	1	1883-1884	7 47	4 04
607	Goffs.....	2,700	2	1916-1919†	8 39	9.76
608	Needles.....	477	29	1892-1921	4 28	4.40
609	Blythe.....	268	9	Broken	4 34	3.70
610	Sterling.....	255	43	1878-1921	2 32	2.30
611	Salton.....	263	18	1889-1907	2 66	2.90
612	Mecca.....	185	16	1905-1921	3 22	2.80
613	Indio.....	20	43	1878-1921	2 91	2.90
614	Andreas Canyon.....	1,000	1	1920-1921	4 07	3.54
615	Palm Springs.....	584	26	1889-1915	4 50	4 60
616	Whitewater Canyon.....	1,500*	1	1919-1920	6 84	5.90
617	Whitewater Ranch.....	1,200*	1	1920-1921	5 70	6.13
618	Millard Forks.....	3,500	1	1920-1921	23 44	25.21
619	Millard Canyon.....	2,500	1	1920-1921	10 93	11.75
620	Cabezon.....	1,779	11	1893-1909	11 60	12.00
621	Whitewater.....	1,123	7	1877-1884	5 21	4.76
622	Soow Creek.....	1,300	1	1920-1921	9 57	10.29
623	Hurley Flat.....	3,500	2	1919-1921	21 49	20.56
624	Banning.....	2,330	8	1899-1921	14 63	16.40
625	Beaumont.....	2,558	16	1888-1921†	19 22	18.50
626	Beaumont (near).....	3,045	10	1911-1921	23 34	22.80
627	San Geronimo Pass.....	2,560	8	1875-1885†	22 67	26.70
628	San Jacinto.....	1,550	28	1893-1921	12 98	13.40
629	Idyllwild.....	5,250	10	1901-1911	27 80	26.10
630	Cahuilla.....	3,600	7	1911-1918	16 99	16.20
631	Aguanga.....	1,986	13	1908-1921	13 76	13.80
632	Oakgrove.....	2,751	7	Broken	17 01	17.36
633	Deadmans Hole.....	3,200	4	1911-1915	21 63	21.63
634	Chihuahua Mountain.....	4,200	4	1911-1915	22 08	21.60
635	Hot Springs Mountain.....	6,200	3	1912-1915	17 79	16.83
636	Eagles Nest.....	4,500	4	1911-1915	17 94	17.55
637	Warner's Springs.....	3,165	15	1906-1921	17 67	17.70

*Estimated.

†Records broken.

TABLE 4—(Continued). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in order of numbers on map, Plate IV.

For alphabetical list see Table 5.

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
638	Puerta La Cruz.....	2,772	4	1911-1915	18.33	17.93
639	Warner Ranch House.....	2,894	4	1911-1915	18.95	18.54
640	Warner Summer Road.....	2,805	4	1911-1915	18.57	18.17
641	Warner Dam site.....	2,702	4	1911-1915	30.34	29.70
642	Monkey Hill.....	2,810	4	1911-1915	15.03	14.70
643	Damron's.....	2,725	4	1911-1915	32.74	32.04
644	Mesa Grande.....	3,350	13	1908-1921	30.39	30.40
645	Matalgul.....	3,200	4	1911-1915	24.01	23.50
646	San Felipe.....	3,600	4	1911-1915	24.00	23.48
647	Divide.....	3,200	3	1912-1915	31.53	29.83
648	Volcan Mountain.....	4,800	4	1911-1915	36.36	35.58
649	Santa Ysabel Ranch.....	3,000	15	1900-1915	24.68	24.02
650	Santa Ysabel Stream.....	2,983	4	1911-1915	27.39	26.08
651	Witch Creek.....	2,800	6	1909-1915	27.19	26.98
652	Julian.....	4,500	22	1880-1921†	32.85	32.10
653	Schilling.....	4,550	3	1912-1915	27.91	26.40
654	Pine Hills Hotel.....	4,100	2	1913-1915	42.88	34.15
655	Rose Glen.....	2,300	4	1911-1915	23.26	22.75
656	Ramona.....	1,440	19	1896-1915	17.25	17.75
657	Santa Maria Dam site.....	1,400	1	1914-1915	28.42	19.21
658	Rockwood Ranch.....	430	22	1893-1915	13.04	13.61
659	Pamo Camp.....	975	1	1914-1915	28.18	19.03
660	Pamo.....	1,050	2	1911-1913	16.21	20.52
661	Sutherland Dam.....	1,900	1	1914-1915	37.37	25.23
662	Pine Mountain.....	2,500	1	1911-1912	19.81	21.53
663	Head of Escondido Ditch.....	1,986	15	1896-1915†	30.92	21.98
664	Amago.....	2,800	7	Broken	23.03	27.90
665	Rincon or Warner's.....	2,975	3	1912-1915	29.20	27.61
666	Mendocall.....	4,500	4	1911-1915	33.46	32.72
667	Nellie.....	5,350	13	1901-1920†	48.38	45.40
668	Valley Center.....	1,360	42	1872-1912†	19.74	19.40
669	Escondido.....	650	24	1897-1921	16.00	16.60
670	Twin Oaks.....	1,000	11	1875-1886	15.47	14.88
671	Oceanside.....	60	10	1909-1919	12.87	12.80
672	Fallbrook.....	700	27	1876-1903	17.27	17.20
673	Elsinore.....	1,234	22	1887-1921†	13.16	13.50
674	Riverside.....	851	40	1881-1921	10.89	10.70
675	Corona.....	615	12	1908-1921†	13.06	13.00
676	Tustin (near).....	200	44	1877-1921	13.13	13.00
677	Santa Ana.....	133	11	1889-1921†	12.98	12.60
678	Orange.....	176	3	1883-1886	15.78	11.34
679	Yorba Linda.....	405	8	1913-1921	14.81	13.51
680	Anaheim.....	134	29	1878-1909†	11.80	12.00
681	Drumm Barracks.....	32	7	1863-1870	9.88	10.62
682	San Pedro.....	19	8	1888-1921†	9.73	10.80
683	Venice.....	50	1	1917-1918	13.62	11.63
684	Avalon.....	30	9	Broken	12.74	12.67
685	Santa Fe Ranch.....	55	4	1911-1915	10.61	9.64
686	Poway.....	460	24	1879-1909†	13.96	13.90
687	Miramar.....	660	14	1901-1915	14.15	13.71
688	La Mesa Dam.....	500	3	1912-1915	14.25	13.48
689	Chollas Heights.....	350	2	1914-1915	19.30	13.04
690	San Diego.....	87	71	1850-1921	9.66	9.94
691	Point Loma.....	302	17	1904-1921	11.20	10.70
692	Otay.....	90	7	1908-1915	11.07	10.83
693	Bonita.....	60	22	1899-1921	10.60	10.60
694	Sweetwater Dam.....	310	27	1888-1915	10.88	10.78
695	La Presa.....	300	1	1914-1915	17.13	11.57
696	End of Flume.....	640	16	1899-1915	13.69	13.53
697	El Cajon.....	482	22	1899-1921	13.75	13.70
698	El Cajon Valley.....	670	7	1908-1915	11.72	11.46
699	Lakeside.....	400	2	1909-1911	12.06	12.30
700	Los Coches Creek.....	710	15	1900-1915	13.63	13.32
701	Los Padres Ranch.....	490	13	1901-1915†	15.87	15.26
702	Dehesa.....	600	6	1902-1908	16.03	14.79
703	Jamul Ranch.....	800	2	1912-1915†	16.77	15.67

†Records broken.

TABLE 4—(Concluded). PRECIPITATION DATA USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in order of numbers on map, Plate IV.**For alphabetical list see Table 5.*

Station on map.	Precipitation station.	Elevation above sea level.	Length of record.	Period of record.	Mean of seasonal precipitation record.	Fifty year mean seasonal precipitation.
Number.		Feet.	Years.		Inches.	Inches.
704	Lower Otay Reservoir	486	9	1906-1915	11 80	11.60
705	Dulzura.....	1,075	1	1914-1915	24 03	16 24
706	Tecate.....	1,775	1	1914-1915	23 75	16 05
707	Potrero.....	2,390	1	1914-1915	27 34	18 47
708	Campo.....	2,543	31	1877-1921†	20 50	20 30
709	Morena Dam.....	3,000	8	1907-1915	21 79	21 79
710	Skye Valley.....	2,550	1	1913-1914	19 45	18 88
711	Barrett Dam.....	1,600	4	1917-1921	17 34	20 59
712	Lyon Peak.....	3,755	1	1914-1915	55 63	37 60
713	Lyon Valley.....	2,200	1	1914-1915	35 59	24 03
714	Lawsoo Valley.....	2,100	1	1914-1915	30 02	20 29
715	Jatapul.....	2,725	1	1914-1915	28 88	19 50
716	Chocolate Creek.....	760	16	1899-1915	17 07	16 95
717	Diverting Dam.....	820	16	1899-1915	16 99	16 86
718	Cuyamaca.....	4,667	33	1898-1921	38 95	38 80
719	East Cuyamaca.....	4,600	3	1912-1915	21 93	20 75
720	Descanso.....	3,400	12	1896-1915†	22 72	25 40
721	Laguna.....	5,440	10	1894-1904	18 59	22 32
722	Brawley.....	105	9	1912-1921	2 38	2 11
723	Imperial.....	65	4	1902-1906	4 58	4 36
724	Heber.....	65	9	1905-1914	2 16	1 88
725	Calxico.....	0	16	1905-1921	2 94	2 50
726	Fort Yuma.....	100	12	1871-1883	3 25	3 12

†Records broken.

TABLE 5. PRECIPITATION STATIONS USED IN
CONSTRUCTING ISOHYETOSE MAP.

Stations listed in alphabetical order.

For list in order of numbers on Plate IV see Table 4.

Precipitation station on map.	Precipitation station on map.	Precipitation station on map.
Number.	Number.	Number.
Abbotts..... 395	Burkhart Ranch..... 548	Divide..... 647
Acton..... 522	Burney..... 55	Dobbins (near)..... 112
Aguanga..... 631	Butt Valley..... 58	Dobie Ranch..... 589
Alameda..... 357	Byron..... 337	Dodgeland..... 124
Alameda Sugar Co..... 328	Cabezon..... 620	Downieville..... 90
Alcatraz Island..... 351	Calaveras..... 316	Drum Forebay..... 82
Alder Creek..... 538	Calaveras River..... 227	Drum Barracks..... 681
Alosta..... 551	Cahuilla..... 630	Drytown..... 210
Alta..... 80	Calixico..... 725	Dublin..... 322
Alturas..... 3	Caliente..... 462	Dudley..... 482
Amago..... 664	Calistoga..... 167	Dulzura..... 705
American Camp..... 226	Campbell..... 301	Dunlap..... 427
Anaheim..... 680	Camp Cady..... 593	Dunnigan..... 183
Anderson..... 47	Camp Independence..... 444	Dunsmuir..... 16
Andreas Canyon..... 614	Campo..... 708	Durham..... 125
Angels Camp..... 221	Camptonville..... 110	Duvall Vineyard..... 330
Angel Island..... 350	Camp Wright..... 144	Dyerville..... 33
Angiola..... 470	Canyon Dam..... 59	Eagle Nest..... 636
Ano Nuevo Island..... 377	Cascada..... 253	East Brother Island..... 344
Antelope Valley..... 483	Cedarville..... 2	East Cuyamaca..... 719
Antioch..... 339	Centerville..... 105	East Park..... 137
Aptos..... 383	Central Point..... 280	Echo Mountain..... 539
Arrowhead Springs..... 581	Cherokee..... 104	Edgewood..... 12
Arroyo Seco..... 540	Cherokee Reservoir..... 103	Edison..... 463
Atascadero..... 488	Chester..... 61	Edison Kern River..... 455
Auberry..... 257	Chico..... 125	Edmanton..... 94
Auburn..... 201	Chihuahu Mountain..... 634	El Cajon..... 697
Avaloa..... 684	China Flat..... 39	El Cajon Valley..... 698
Azusa..... 549	Chino..... 569	El Dorado..... 207
Bagdad..... 605	Chocolate Creek..... 716	Electra..... 215
Bakersfield..... 475	Chollas Heights..... 689	Ellis..... 335
Banning..... 624	Christmas Prairie..... 26	El Mocho Viocyard..... 331
Barrett Dam..... 711	Chualar..... 391	Elsinore..... 673
Barstow..... 591	Churo Creek..... 48	Emigrant Gap..... 86
Bear River..... 231	Chute Camp..... 115	End of Flume..... 696
Bear River Reservoir..... 232	Cisco..... 87	Escondido..... 669
Bear Valley..... 460	Claremont..... 555	Eureka..... 27
Bear Valley Dam..... 584	Clear Lake (Modoc County)..... 5	Fairfield..... 173
Beaumont..... 625	Cloverdale..... 154	Fairmont..... 518
Beaumont (near)..... 626	Cloveris..... 410	Fallen Leaf..... 233
Beckwith..... 66	Coalinga..... 399	Fallbrook..... 672
Bellota..... 193	Colby Camp..... 542	Farallones Light House..... 157
Benicia..... 171	Colfax..... 75	Farmington..... 288
Ben Lomond..... 379	Colgate..... 114	Felton..... 381
Benson's Ferry..... 191	Colton..... 571	Fenner..... 606
Berryvale (Sisson)..... 14	Colusa..... 133	Firebaugh..... 404
Berkeley..... 353	Converse Nursery..... 598	Fish Canyon..... 552
Betteravia..... 492	Corning..... 127	Follows Camp..... 557
Big Bar..... 40	Corona..... 675	Folsom..... 197
Big Bear Tavern..... 596	Covelo Ranger Station..... 143	Fontana..... 573
Big Dry Creek..... 409	Coulterville..... 275	Fordyce Dam..... 88
Biggs..... 123	Craftonville..... 577	Fort Bidwell..... 1
Big Sur..... 392	Crescent City..... 25	Fort Bragg..... 149
Bishop..... 242	Crockett..... 342	Fort Crook..... 7
Bishop Creek..... 243	Crocker's..... 269	Fort Gaston..... 23
Bishop Ranch..... 324	Crystal Springs Cottage..... 369	Fort Humboldt..... 28
Blanch Gage..... 315	Cuyamaca..... 718	Fort Jones..... 18
Blocksburg..... 34	Daggett..... 592	Fort Mason..... 359 A
Blue Canyon..... 81	Dameron's..... 643	Fort Miller..... 256
Blythe..... 609	Davis..... 187	Fort Point..... 361
Boca..... 70	Deadmans Hole..... 633	Fort Ross..... 155
Bodie..... 239	Deep Creek..... 583	Fort Tejon..... 513
Bonita..... 693	Deer Creek..... 83	Fort Yuma..... 726
Borden..... 406	Delano..... 471	Fouts Springs..... 138
Borel..... 454	Del Monte..... 389	Frazier Mine..... 512
Boulder Creek..... 378	Delta..... 53	Fresno..... 411
Bowmans Dam..... 91	De Saba..... 99	Friant..... 407
Branscombe..... 151	Delhesa..... 702	Fruto..... 135
Brawley..... 722	Denair..... 284	Galt..... 194
Brentwood..... 338	Descanso..... 720	Gem Lake..... 251
Bridgeport..... 238	Devils Canyon..... 585	Georgetown..... 203
Brighton..... 195	Devore Ranch..... 588	Gilroy..... 295
Bryant's Ranch..... 534	Dinuba..... 422	Gilta..... 231
Buchanan..... 262	Divertiog Dam..... 717	Glacier Point..... 265

TABLE 5—(Continued). PRECIPITATION STATIONS USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in alphabetical order.**For list in order of numbers on Plate IV see Table 4.*

Precipitation station on map.		Precipitation station on map.		Precipitation station on map.	
	Number.		Number.		Number.
Glendora	550	Kings River	425	Matagul	645
Glen Ranch	587	Knights Landing	185	May Canyon	532
Glenaville	452	Knob	42	McCloud	15
Glenwood	380	Knoxville	180	McClung Ranch	477
Goffs	607	Kono Tayee (Lakeport)	139	McKinney	74
Gold Run	78	La Crescenta	530	Mecca	612
Gonzales	393	La Grange	276	Melones	222
Gosben	418	Laguna	721	Mendenhall	666
Grass Valley	117	Lake Chabot	355	Mendocino	148
Gray Mountain	590	Lake Eleanor	268	Mendota	403
Grayson	291	Lake Honda	363	Menlo Park	373
Greenland Ranch	447	Lake Merced	364	Merced	278
Greenville	62	Lakeport	140	Merced Falls	277
Gridley	122	Lakeside	699	Mesa Grande	644
Groveland	271	Lakeside Ranch	478	Middletown	164
Grizzly Flat	230	Lake Sebrina	244	Middlewater	481
Guinda	182	Lake Spaulding	89	Midway	334
Hagerman Ranch	329	Lake Temescal	354	Millard Canyon	619
Haines Canyon	533	La Libre	515	Millard Forks	618
Hamptonville	408	La Mesa Dam	688	Mill Creek No. 1	214
Hanford	413	Lancaster	519	Mill Creek No. 2	579
Hansen Ranch	536	La Porte	92	Mills College	358
Happy Camp	20	La Presa	695	Milo	431
Hayfork	37	Las Plumas	102	Milton	220
Head Dam	111	Lathrop	290	Miramar	687
Head of Escondido Ditch	663	Laurel	298	Mission Valley	602
Healdsburg	160	Laws	241	Mitchell Mill	228
Hearst	175	Lawson Valley	714	Modesto	293
Heber	724	Laytonville	152	Mojave	457
Helen Mine	165	Le Grand	279	Mokelumne Hill	216
Hetch Hetchy	267	Lemon Cove	428	Monkey Hill	642
Highland Springs	161	Lemoore	412	Mono Ranch	507
Hills Ferry	282	Lewis Valley	430	Monrovia Canyon	547
Hillside Reservoir	245	Lick Observatory	304	Montague	10
Hobart Mills	69	Lindsay	416	Monterey	390
Holcomb	594	Little Rock Creek	520	Monterio	517
Holcomb Creek	595	Little Stony	136	Montgomery Creek	54
Hollister	386	Live Oak Canyon	566	Monumental	24
Hornbrook	9	Livermore	332	Morengo Valley	603
Hot Springs	449	Livingston	283	Morena Dam	709
Hot Springs Mountain	635	Llano	560	Morgan Hill	297
Hueneme	502	Lodi	192	Morse's House	582
Hullville	142	Lompoc	493	Mountain Springs	564
Humburg Valley	57	Lone Pine	445	Mountain View	375
Hurley Flat	623	Long Camp	225	Mount Day	317
Huntington Lake	252	Long Valley	65	Mount Diablo	340
Hyampom	38	Longworth	286	Mt. Lowe Observatory	543
Hydesville	30	Lordsburg	571	Mount Tamalpais	347
Idria (new Idria)	401	Los Alamos	496	Mount Wilson	544
Idyllwild	629	Los Angeles	528	Month, San Antonio	563
Imola	175	Los Banos	281	Mumford Hill	95
Imperial	723	Los Coches Creek	700	Mutah Flat	510
Indio	613	Los Gatos	300	Mundy's	205
Inskip	96	Los Molinos	44	Napa City	176
Ione	211	Los Padres Ranch	701	Needles	608
Iowa Hill	76	Lower Crystal Springs	368	Nellie	667
Isabella	453	Lower Haines	535	Nevada City	116
Jacinto	130	Lower Otay Reservoir	704	Nevis	60
Jackson	212	Lundy Reservoir	240	Newcastle	200
Jacksonville	272	Lyon Peak	712	Newhall	525
Jamestown	274	Lyon Valley	713	New Idria	400
Jamul Ranch	703	Lytle Creek	586	Newman	294
Japatul	715	Maedoe	8	Nicolas	184
Jenny Lind	219	Madeline	4	Niles	319
Jolon	486	Magalia	100	Nordhoff	506
Julian	652	Magie Hill	523	North Bloomfield	84
Keeler	446	Magunden Sub.	465	North Fork	259
Keene	461	Malakoff Mine	85	North San Juan	113
Kennedy Mine	213	Manzanara	516	Oakdale	287
Kennett	52	Maricopa	480	Oakgrove	632
Kentfield	346	Mariposa	264	Oakland	359
Kernville	451	Markleeville	235	Oakville	178
King City	397	Martinez	172	Oceanside	671
Kingsburg	420	Marysville	120	Ogiers	314

TABLE 5—(Continued). PRECIPITATION STATIONS USED IN CONSTRUCTING ISOHYETOSE MAP.

Stations listed in alphabetical order.

For list in order of numbers on Plate IV see Table 4.

Precipitation station on map.	Precipitation station on map.	Precipitation station on map.
Number.	Number.	Number.
Oil Center..... 467	Priest Valley..... 398	Santa Ana River..... 580
Ojai Valley..... 505	Princecton..... 132	Santa Anita Forest Station..... 545
Okell..... 174	Puerta La Cruz..... 638	Santa Barbara..... 500
Oleta..... 209	Quincy..... 93	Santa Clara..... 302
O'Melveny Camp..... 554	Ramona..... 656	Santa Cruz..... 382
Orange..... 678	Rancho Del Jurupa..... 572	Santa Fe Ranch..... 685
Orland..... 128	Ravenoa..... 521	Santa Margarita..... 489
Orleans..... 22	Raywood Flat..... 599	Santa Maria..... 491
Oroville..... 106	Red Bluff..... 45	Santa Maria Damsite..... 657
Otay..... 692	Redding..... 51	Santa Monica..... 527
Owens Valley No. 2..... 246	Red Dome..... 601	Santa Paula..... 504
Owens Valley No. 3..... 247	Redlands..... 576	Santa Rosa..... 168
Owens Valley No. 4..... 248	Reedley..... 423	Santa Ysabel Ranch..... 649
Owens Valley No. 5..... 249	Repressa..... 198	Santa Ysabel Stream..... 650
Owens Valley No. 6..... 250	Rincon or Warner's..... 665	Sausalito..... 348
Owens Valley No. 7..... 443	Rings Station..... 600	Schilling..... 653
Owens Valley No. 8..... 442	Rio Bravo Ranch..... 464	Scott Valley..... 17
Owens Valley No. 9..... 441	Rio Vista..... 190	Secood Garrotte..... 270
Owens Valley No. 10..... 440	Riverside..... 674	Selma..... 421
Owens Valley No. 11..... 439	Rocklin..... 199	Serriterre..... 108
Owens Valley No. 12..... 438	Rockwood Ranch..... 658	Seven Oaks..... 597
Owens Valley No. 13..... 437	Robnerville..... 29	Shasta..... 49
Owens Valley No. 14..... 436	Rosedale Ranch..... 471	Shield's Ranch..... 237
Owens Valley No. 15..... 435	Rose Glen..... 655	Shingle Springs..... 208
Owens Valley No. 16..... 434	Rosewood..... 46	Shively..... 32
Ozena..... 508	Rose Mine..... 604	Sierra Madre..... 546
Pajaro..... 385	Round Valley..... 56	Sierraville..... 68
Palerme..... 107	Rumsey..... 181	Sims..... 50
Palmdale..... 537	Ruth..... 36	Sisquoc Ranch..... 497
Palm Springs..... 615	Sacramento..... 196	Sisson..... 13
Pamo..... 660	St. Helena..... 179	Sister Elsie Peak..... 541
Pamo Camp..... 659	St. Helena Mountain..... 166	Skye Valley..... 710
Panoche..... 402	Saint John..... 129	Smartsville..... 118
Parkfield..... 484	Salinas..... 387	Smith's Ranch..... 514
Pasadena..... 529	Salton..... 611	Saow Creek..... 622
Paso Robles..... 487	San Parks..... 313	Soledad..... 394
Pattway..... 509	San Andreas..... 217	Sonoma..... 177
Peachland..... 159	San Andreas Reservoir..... 366	Sonora..... 273
Penstock Camp..... 224	San Ardo..... 396	South East Farallon..... 158
Petaluma..... 169	San Antonio Canyon..... 562	South Vallejo..... 170
Phoenix Dam..... 223	San Bernardino..... 575	Spadra..... 568
Piedra..... 426	San Diego..... 690	Spreekels..... 388
Pigeon Point..... 376	San Emidio..... 479	Spring Valley Water Co. No. 101..... 325
Pilarcitas..... 371	San Felipe..... 646	Spring Valley Water Co. No. 102..... 326
Pilot Creek..... 204	San Fernando..... 526	Spring Valley Water Co. No. 103..... 327
Pinchot..... 524	San Francisco..... 358A	Spring Valley Water Co. No. 104..... 333
Pine Crest..... 499	San Gabriel Intake..... 556	Spring Valley Water Co. No. 105A..... 308
Pioe Hills Hotel..... 654	San Gabriel Power House..... 553	Spring Valley Water Co. No. 106A..... 309
Pine Mountain..... 662	Sanger..... 424	Spring Valley Water Co. No. 107..... 310
Pittville..... 6	San Geronio Pass..... 627	Spring Valley Water Co. No. 108..... 307
Placerville..... 206	San Jacinto..... 628	Spring Valley Water Co. No. 109..... 306
Pleasanton..... 321	San Joaquin Light and Power Co. (Crane Valley)..... 261	Spring Valley Water Co. No. 110..... 305
Point Arena..... 153	San Joaquin Light and Power Co. (Power House No. 3)..... 260	Spring Valley Water Co. No. 111..... 312
Point Bonita..... 349	San Joaquin Light and Power Co. (Res. No. 1)..... 258	Spring Valley Water Co. No. 112..... 311
Point Conception..... 362	San Jose..... 303	Springville..... 432
Point Lobos..... 691	San Leandro..... 356	Squirrel Inn..... 578
Point Loma..... 691	San Luis Obispo..... 490	Standish..... 64
Point Montara..... 365	San Mateo..... 367	Stanley Miller Mine..... 558
Point Reyes..... 156	San Miguel..... 485	Stanwood..... 101
Pomona..... 567	San Miguel Island..... 495	Sterling..... 610
Porterville..... 415	San Pablo Lake..... 343	Stevenson Creek..... 254
Portola..... 67	San Pedro..... 682	Stirling City..... 98
Portola Woods..... 374	San Rafael..... 345	Stockdale..... 476
Poso Ranch..... 472	Santa Ana..... 677	Stockton..... 289
Potrero..... 707		
Poway..... 686		
Presidio..... 360		

TABLE 5—(Concluded). PRECIPITATION STATIONS USED IN CONSTRUCTING ISOHYETOSE MAP.

*Stations listed in alphabetical order.**For list in order of numbers on Plate IV see Table 4.*

Precipitation station on map.	Precipitation station on map.	Precipitation station on map.
Number.	Number.	Number.
Storey..... 405	Tulare..... 414	Wasioja..... 498
Strawberry Flat..... 77	Tule River..... 433	Watsonville..... 384
Suisun..... 173	Turlock..... 285	Weaverville..... 41
Sulphur Banks..... 163	Tustin (near)..... 676	Weidman Ranch..... 323
Summerdale..... 263	Twin Oaks..... 670	Weldon..... 450
Summit..... 72	Twin Valley..... 162	West Branch..... 97
Summer..... 466	Two Canyon Ranch..... 555	West Butte..... 121
Suool..... 320	Ukiah..... 147	Westley..... 292
Susanville..... 63	Upland..... 570	Westpoint..... 229
Sutherland Dam..... 661	Upper Crystal Springs..... 370	Westport..... 150
Sweetwater Dam..... 694	Upper Lake..... 511	West Saticoy..... 503
Tahoe..... 73	Upper Lake (Lake County)..... 141	Wheatland..... 119
Tallac..... 234	Upper Mattole..... 31	Whitewater..... 621
Tamarack..... 236	Vacaville..... 189	Whitewater Canyon..... 616
Taylor's Ranch..... 456	Valley Center..... 668	Whitewater Ranch..... 617
Tecate..... 706	Valley Springs..... 218	Williams..... 134
Tehachapi..... 458	Valyermo..... 559	Willits..... 146
Tehama..... 43	Venice..... 683	Willows..... 131
Tejon Ranch..... 459	Ventura..... 501	Winters..... 188
Tennant..... 296	Vestal..... 469	Wire Bridge..... 202
Tequisquita Ranch..... 318	Visalia..... 417	Witch Creek..... 651
Thermal Heights..... 468	Volcan Mountain..... 648	Woodland..... 186
Three Rivers..... 429	Voltaire..... 561	Woodleaf..... 109
Toll House..... 255	Walla Walla Creek..... 19	Woodside..... 372
Towle..... 79	Walnut Creek..... 341	Wrights..... 299
Tracy..... 336	Warner Damsite..... 641	Yerba Buena Island..... 352
Traver..... 419	Warner Ranch House..... 639	Yorba Linda..... 679
Trona..... 448	Warner's Springs..... 637	Yosemite..... 266
Truckee..... 71	Warner Summer Road..... 640	Yreka..... 11
Tujunga..... 531	Wasco..... 473	Zenia..... 35

WATER RESOURCES OF CALIFORNIA.

TABLE 6.

TABLE 6. ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Page index.		Data.	Section and key letter.	System or locality.	Page index.		Data.	Measured.	Proposed.
		Measured.	Proposed.				G	N				M
A											
7-S	"A" Canal.....				2-B	Banning Water Company.....			x	x	129
11-A	Alameda County Water District.....				7-C	Banta-Carlsona Irrigation District.....			x	x	173
13-Q	Alameda Mutual Water Company.....				1-P	Bear River Mutual Water Company.....			x	x	122
7-L	Aliso Canal.....				14-O	Beardsley Water Ditch Company.....			x	x	126
7-W	Alpaugh Irrigation District.....				1-K	Beardsley Canal.....			x	x	166
7-W	Alpaugh Irrigation District.....				7-Y	Beaumont Irrigation District.....			x	x	123
7-Q	Alta Irrigation District.....				2-B	Bell Water Company.....			x	x	129
7-Q	Alta Irrigation District.....				1-E	Beta Main Canal.....			x	x	120
1-N	Alta Loma Mutual Water Company.....				7-S	Big Pine Canal: Owens River and—			x	x	147
1-A	Altura: Pit River Valleys near—				5-D	Big Valley, Lassen County.....			x	x	138
16-J	American Canyon Water Company.....				16-G	Big Valley, Lassen County.....			x	x	138
14-R	American Seedless Raisin Company.....				5-C	Bishop Creek Association.....			x	x	145
7-I	American Seedless Raisin Company.....				5-C	Bishop Creek Canal.....			x	x	157
7-I	Anaheim Water Company.....				5-C	Bishop Creek Canal.....			x	x	122
1-S	Anderson Canal.....				7-M	Blythe Canal.....			x	x	144
7-Y	Anderson-Cottonwood Irrigation District.....				8-C	Boston Land Company.....			x	x	166
13-A	Anderson-Cottonwood Irrigation District.....				1-H	Brown Slough.....			x	x	156
4-C	Appleton Land, Water & Power Company.....				7-L	Browns Valley Canal.....			x	x	151
7-W	Area irrigated from Deer Creek.....				14-J	Browns Valley Irrigation District.....			x	x	140
7-W	Area irrigated from White River.....				7-Z	Buena Vista Canal.....			x	x	173
1-H	Arroyo Ditch and Water Company.....				7-U	Buron Ditch.....			x	x	
9-A	Atascadero Colony.....				7-C	Byron-Bethany Irrigation District.....			x	x	
1-B	Atmore Ditch.....				7-C	Byron-Bethany Irrigation District.....			x	x	
2	Average of 18 mutual water companies.....										
2	Average of 56 mutual water companies.....										
1-K	Azusua Irrigation Company.....										
B											
16-D	Babeock, Soile and Martin Canal.....				2-B	Cabezon Water Company.....			x	x	129
1-J	Baldwin Park Water Company.....				1-G	California Domestic Water Company.....			x	x	121
1-D	Ballona Irrigation Association.....				1-F	California-Michigan Land & Water Co.....			x	x	121
2-B	Banning Heights Mutual Water Company.....				7-J	California Packing Corporation.....			x	x	152

Note—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 6.

TABLE 6—(Continued). ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Page index.		Data.			Section and key letter.	System or locality.	Page index.		Data.		
		Measured.	Proposed.	G	N	M			G	N	M	Measured.	Proposed.
1-C	Carmel Water Company	119		x	x		7-J	Crocker-Huffman Land & Water Company.	144		x		182
14-S	Carmichael Irrigation District.		181	x	x		16-K	Crooks Canyon Irrigation District.			x		120
7-Z	Carmichael Slough Ditch	155		x	x		1-F	Crown Water Company.	120		x		170
1-S	Carpenter Water Company: J. T.—	128		x	x		1-M	Cucamonga Plains: Pomona Valley and—	125		x		
7-Y	Castro Canal	153		x	x		1-N	Cucamonga Water Company.	148		x		
1-H	Cate Ditch Company	121		x	x		7-S	Cuthbert-Burrell Canal			x		176
13-M	Central Canal	159		x	x		9-C	Cuyama: Santa Maria and—Valleys.	130		x		
7-Y	Central Canal & Irrigation Company.	155		x	x		2-E	Cuyamaca Water Company.			x		
1-N	Chino Water Company	145		x	x		D						
7-L	Chowchilla Canal		175					Deer Creek: Area irrigated from—					
7-K	Chowchilla Irrigation District (projected)		171				7-W	Dell Canal	151		x		
2-E	Chula Vista Mesa Sweetwater Valley and—	125		x	x		5-C	Del Norte Irrigation Company	138		x		
1-O	Citizens Land and Water Company		181	x	x		1-M	Del Norte Water Company	124		x		
14-S	Citrus Heights Irrigation District.	126		x	x		1-A	Del Norte Water Company	117		x		
1-O	City of San Diego.	131		x	x		1-N	Delta Lands of Sacramento and San Joaquin Rivers	125		x		
2-E	City Creek Water Company	132		x	x		12-A	Delta Lands of Sacramento and San Joaquin Rivers	158		x		
1-L	Claremont Cooperative Water Company	135		x	x		12-A	Delta Lands of Sacramento and San Joaquin Rivers			x		
3-A	Coachella Valley Farms	145		x	x		14-Q	Diamond Ridge Water Company	165		x		
7-M	Columbia Canal	122		x	x		13-Y	Dixon Area	123		x		
1-J	Columbia Land and Water Company	162		x	x		1-K	Duarte Mutual Irrigation & Canal Company	159		x		
13-N	Cobles: Farms in Tehama, Glenn, — and Yolo counties	168		x	x		13-H	Durham State Land Settlement			x		
13-P	Colusa Irrigation Company	158		x	x		E						
16-D	Company Canal		177					East Contra Costa Irrigation Company	140		x		179
13-C	Coneland Water Company (Los Molinos Land Company)	146		x	x		7-B	East Dixon Irrigation and Drainage Association	120		x		
13-C	Coneland Water Co. (Los Molinos Land Company)	175		x	x		13-Y	East Gardena Water Company	145		x		
7-R	Consolidated Canal Company	120		x	x		1-E	East Side Canal	154		x		
7-R	Consolidated Irrigation District	168		x	x		7-M	East Side Canal	171		x		
1-F	Consolidated Water Company	163		x	x		7-Y	East Side Canal, Kern River	158		x		
14-M	Coon Creek Area	177		x	x		2-E	El Cajon Valley	177		x		
16-B	Cottonwood Irrigation & Mining Company	170		x	x		13-B	El Camino Irrigation District.	179		x		
13-Q	Corbua Irrigation District.	122		x	x		13-B	El Camino Irrigation District.	167		x		
13-Q	Corbua Area: San Joaquin Valley	123		x	x		14-B	Elder Creek Area.			x		
1-R	Corina Irrigation Company	147		x	x		14-Q	El Dorado Water Company			x		
1-J	Covina: Lands near—			x	x								
7-S	Crescent Canal			x	x								

Note:—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 6.

TABLE 6—(Continued.) ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Data.			Page index.		Section and key letter.	System or locality.	Data.			Page index.	
					Measured.	Proposed.						Measured.	Proposed.
		G	N	M					G	N	M		
7-S	Emigrant Canal.	x		x	147		1-B	Fillmore Water Company.			x		119
8-A	Esther and Alexander Farm.		x	x	157		7-T	Fleming Ditch.				x	149
2-D	Escudido Mutual Water Company.		x	x	130		6-C	Foothill Ditch Company.				x	139
	Escudido: See San Luis Rey to Linda Vista Area.						7-S	Foothill Irrigation District.			x		148
1-N	Etivanda Water Company.			x	125		7-S	Foothill Irrigation District.			x	x	125
1-G	Euclid Avenue Water Company.		x	x	121		1-N	Fontana Development Company.			x	x	145
7-T	Evans Ditch.		x	x	149		7-P	Foothill Canal.			x	x	146
14-I	Excelsior Water and Mining Co.	x	x	x	166		7-P	Foothill Canal.			x	x	146
							7-P	Foothill Canal.			x	x	145
							7-O	Foothill Canal.			x	x	122
							1-H	Foothill Canal.			x	x	129
							2-C	Foothill Canal.			x	x	
14-T	Fair Oaks Irrigation District.				167								
14-T	Fair Oaks Irrigation District.				138								
5-C	Farmers Canal.	x	x	x	153								
7-Y	Farmers Ditch.	x	x	x	149								
1-B	Farmers Ditch Company.	x	x	x	118								
1-B	Farmers Ditch Company.	x	x	x	118								
13-Q	Farm Land Investment Company.	x	x	x	160-163								
13-S	Farms between Marysville and Wheatland.	x	x	x	163								
13-J	Farms east of Sacramento River.	x	x	x	161								
13-N	Farms in Tehama, Glenn, Colusa and Yolo counties.	x	x	x	162								
					144								
7-L	Farms in vicinity of Mendota.	x	x	x	144								
13-O	Farms near Gridley.	x	x	x	160								
13-F	Farms near Orland.	x	x	x	159								
1-M	Farms near Pomona.	x	x	x	124								
7-R	Farms near Reedley.	x	x	x	147								
13-K	Farms near Willows.	x	x	x	159								
13-X	Farms near Woodland.	x	x	x	164								
14-L	Feather River Area.	x	x	x	180								
13-Q	Feather River Area.	x	x	x	178								
13-R	Feather River Irrigation District.	x	x	x	178								
14-K	Feather River Valley Farms.	x	x	x	166								
1-B	Fillmore Irrigation Company.	x	x	x	119								

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TABLE 6.

TABLE 6—(Continued.) ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Page index.			Data.			System or locality.			Page index.			
		Measured.	Proposed.		G	N	M	G	N	M	Measured.	Proposed.		
H														
16-D	Haight, Dexter and Kegg Canal.....	168			x	x	x	x	13-E	p	Iron Canyon Reservoir: Lands under—Project.....		177	
1-C	Haines Canyon Water Company.....	119							1-M		Irrigation Company of Pomona.....			
7-T	Hamilton Ditch.....	150			x	x	x	x	7-S		Island Canal.....		124	
14-C	Happy Valley Irrigation District.....	165			x	x	x	x	7-R		Island No. 3, Consolidated and Los Emigrants.....		147	
14-C	Happy Valley Irrigation District.....				x	x	x	x	7-R	p	Island No. 3 Irrigation District.....		147	
1-B	Hardgrave and Comfort Ditch.....		179											
1-B	Harrison Ranch Company.....	118			x	x	x	x	13-L	p	Jacinto Irrigation District.....		178	
16-D	Hart and Hoyt Canal.....	168			x	x	x	x	7-Z		James Canal.....		155	
7-L	Helm Canal.....	145			x	x	x	x	7-O		James Irrigation District.....		145	
2-C	Hemet, Lake—Water Company.....	130			x	x	x	x	7-O		James Pump, Fresno Slough.....		145	
1-T	Hermosa Water Company.....	128			x	x	x	x	7-Z		Jap Canal.....		155	
14-Q	H. Parker Farm, El Dorado County.....		181		x	x	x	x	14-A		Jas. Mills Orchards Corporation.....		165	
14-H	Honeycut-Yuba Irrigation District.....	179			x	x	x	x	14-A	p	Jas. Mills Orchards Corporation.....			
10-Q	Honey Lake Valley.....	183			x	x	x	x	10-L		Jennings Ditch.....		150	
16-Q	Honey Lake Valley Irrigation District.....	182			x	x	x	x	10-L		Jess Valley.....		169	
									1-S		J. T. Carpenter Water Company.....		128	
I														
1-N	Imamoa Water Company.....	125			x	x	x	x	7-C	p	Kasson Irrigation District.....		173	
3-H	Imperial East Side Water Company.....	136			x	x	x	x	7-T		Kaweah River (area irrigated by).....		150	
3-F	Imperial Irrigation District.....	134			x	x	x	x	10-D		Kegg Canal.....		168	
3-G	Imperial South Side Water Company.....	135			x	x	x	x	7-Y		Kern Island Canal.....		154	
3-F	Imperial Valley.....		171						7-Y		Kern River Areas.....			
3-E	Imperial Water Company No. 1.....	133			x	x	x	x	7-Z	p	Kern River Delta.....			
3-D	Imperial Water Company No. 2.....	133			x	x	x	x	7-Z	p	Kern River Canal & Irrigation Company.....		155	
3-B	Imperial Water Company No. 3.....	132			x	x	x	x	7-Y	p	Kings River Areas.....			
3-C	Imperial Water Company No. 4.....	132			x	x	x	x	7-Q	p	Kings River Conservancy District.....		176	
3-G	Imperial Water Company No. 5.....	134			x	x	x	x	7-S	p	Kings River: San Joaquin and—Canal Company.....		175	
3-H	Imperial Water Company No. 6.....	136			x	x	x	x	7-S	p	Kirk Canal.....		175	
3-G	Imperial Water Company No. 7.....	135			x	x	x	x	11-B		Klamath Project, U. S. R. S.....			
3-G	Imperial Water Company No. 8.....	132			x	x	x	x	16-A		Klamath Project, U. S. R. S.....		144	
3-B	Imperial Water Company No. 9.....	132			x	x	x	x	16-A	p	Klamath Project, U. S. R. S.....		158	
3-D	Imperial Water Company No. 12.....	133			x	x	x	x	16-A	p	Klamath River Lands.....		167	
1-B	Interurban Land & Water Company.....	118			x	x	x	x	7-B	p	Knightsen Irrigation District.....		182	
													173	

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TABLE 6.

TABLE 6—(Continued). ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Page index.		Data.		Section and key letter.	System or locality.	Page index.		Data.		Section and key letter.	System or locality.	Page index.	
		Measured.	Proposed.	G	N			M	Measured.	Proposed.	G			N	M	Measured.	Proposed.
L															
7-S	Laguna Irrigation District.....														
2-C	Lake Hemet Water Company.....	148		x										137	
7-S	Lake Lands Canal.....	130		x	x									168	
7-T	Lakeside Ditch.....	148		x	x									168	
2-E	La Mesa, Lemon Grove and Spring Valley Irrigation District.....	150		x	x									145	173
16-C	Lands in Shasta Valley.....	131	182	x											183
1-J	Lands near Covina.....	123		x										158	
14-H	Lands under Grizzly Creek, Butte and Yuba counties.....			x										158	
13-E	Lands under Iron Canyon Reservoir Project.....			x	x									121	177
1-D	La Rica Water Company.....	120	180	x	x									166	180
16-P	Lassen Irrigation Company.....	169	177	x	x									126	181
16-H	Lassen; Modoc and—County Valleys Tributary to the Pit River.....		182	x	x									126	176
7-S	Last Chance Water Ditch Company.....	148		x											
1-L	La Verne Irrigation Company.....	123		x	x										
1-L	La Verne Land and Water Company.....	123		x	x										
6-D	Lemon Grove Ditch.....	139		x											
2-E	Lemon Grove; La Mesa, —and Spring Valley Irrigation District.....														
7-S	Lempore Canal and Irrigation Company.....	131		x										145	175
7-X	Lerdo Canal.....	148		x										139	
7-R	Les Emigrants; Island No. 3 Consolidated and—Liberty Canal.....	147		x	x									125	
7-S	Liberty Canal.....	148	178	x										163	
13-V	Lincoln; Sacramento—Area.....		171	x										138	
2-D	Linda Vista Mesa.....		171	x										157	
2-D	Linda Vista Area; San Luis Rey to.....			x	x									141	174
6-F	Lindsay-Strathmore and Terra Bella Irrigation Districts.....	139	173	x										126	
6-E	Lindsay-Strathmore Irrigation District.....			x	x									139	174
6-E	Lindsay-Strathmore Irrigation District.....		173	x	x										
1-I	Lindsay Water Development Company.....	139		x											
1-I	Little Lake Ditch.....	122		x											181
M															
	Madara Canal and Irrigation Company.....			x	x									145	175
	Madara Irrigation District.....			x	x									139	
	Marks and Rice Ditch.....			x										169	
	Marlin Canal.....			x										125	
	Marygold Mutual Water Company.....			x	x									163	
	Marysville; Farms between—and Wheatland.....			x	x									150	
	Mathews Ditch.....			x										138	
	McNally Canal.....			x	x									157	
	McNally Irrigation Company.....			x	x									141	174
	Medano Irrigation District.....			x										126	174
	Mendota; Farms in vicinity of.....			x	x									139	
	Mendota Irrigating Company.....			x	x										
	Mercer Irrigation District.....			x	x										
	Merrymun Ditch.....			x											
	Miebigan Bar Area.....			x											181

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TABLE 6.

Section and key letter.	System or locality.	Page index.			Data.			System or locality.	Page index.		
		G	N	M	Measured.	Proposed.	G		N	M	Measured.	Proposed.
14-V	Michigan Bar Lands	x			167		5-A	p	Newlands Project, U. S. R. S. (Truckee-Carson Project).....		172
7-L	Miller and Lux Canal	x			144		14-E		Newtown Ditch	x	166
7-S	Mill Races	x	x		148		16-I	p	North Central Mountain Valleys	x	182
14-A	Mills; Jas.—Orchards Corporation	x	x		165	179	14-S	p	North Fork Dutch Company	x	181
14-U	Mills; Jas.—Orchards Corporation	x	x		-	181	1-O		North Fork Water Company	x	126
14-U	Miner's Ravine: Lower—	x	x		181	181			O		
14-U	Miner's Ravine: Upper—	x	x		181						
2-B	Mission Valley	x			130						
1-H	Mission Valley Acres	x	x		122						
7-H	Modesto and Turlock Irrigation Districts	x	x		174		5-E		Oak Creek Area	x	138
7-F	Modesto Irrigation District	x	x		141	174	6-A	p	Oakdale Irrigation District	x	139
7-F	Modesto Irrigation District	x	x				7-T		Oakdale Irrigation District	x	149
16-H	Modoc and Lassen County Valleys tributary to the Pit River	x	x		182		1-U		Oakes Ditch	x	129
7-T	Modoc Ditch	x			150		1-N	p	Oceanside Mutual Water Company	x	125
4-D	Mojave River Irrigation District	x	x		137	172	1-T	p	Old Northern Water Company	x	150
4-D	Mojave River Irrigation District	x	x		120		13-F		Orange County Coastal Plain and Mea	x	150
1-E	Mojave River Irrigation District	x	x		117		13-F		Orland, Farms near—	x	150
1-A	Moneta Water Company	x	x		117		13-F	p	Orland Project, U. S. R. S.	x	150
1-A	Montalvo Irrigation Company	x	x		119		14-E		Orland Project, U. S. R. S.	x	165
1-C	Montalvo Irrigation Company	x	x		125		14-E	p	Oroville Water Company	x	165
1-M	Montebello Land and Water Company	x	x		120		14-F	p	Oroville-Wyandotte Irrigation District	x	179
1-M	Monte Vista Irrigation Company	x	x		125		14-F		Oro Water, Light and Power Company	x	171
E3-X	Moore Ditch, Yolo County	x			164		2-E	p	Otay and Tia Juana Valleys	x	138
1-A	Mound Water Company	x	x		117		5-C		Owens River	x	138
1-O	Mound Water Company	x	x		126		5-D		Owens River and Big Pine Canal	x	138
	Mount Vernon Water Company	x	x		126		5-E		Owens River Canal	x	138
	N								P		
7-C	Naglee-Barke Irrigation District	x			140	173	14-E		Pacific Gas & Electric Co., 8 miles north of Oroville	x	165
7-C	Naglee-Burke Irrigation District	x			167		14-E		Pacific Gas & Electric Co., near Oroville	x	165
15-C	Napa Valley	x	x		164		14-O		Pacific Gas & Electric Co., Placer County	x	166
13-W	Natomas Company of California	x	x		167		14-O		Packwood Ditch	x	150
14-T	Natomas Water Company	x	x		180		11-D		Pajaro Valley Pumping Plants	x	158
14-T	Nevada Irrigation District	x	x				14-G		Palermo Land and Water Company	x	165
6-A	Newlands Project, U. S. R. S. (Truckee-Carson Project)	x			137						

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TABLE 6.

TABLE 6—(Continued). ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Page index.		Data.			Section and key letter.	System or locality.	Page index.		Data.			Page index.
		Measured.	Proposed.	G	N	M			Measured.	Proposed.	G	N	M	
14-G p	Palermo Land and Water Company.		179	x			15-B	Rancho Lenoso, Berryessa Valley.			x		x	167
4-A p	Palmdale Irrigation District.		172	x			5-C	Rawson Canal.			x		x	138
4-A p	Palmdale Water Company.			x			13-T	Reclamation District No. 108.			x		x	163
1-M	Palmdale Water Company.	137	172	x			7-S	Reed Canal.			x		x	148
3-J	Palomares Irrigation Company.	124		x			7-R	Reedley Farms near—			x		x	147
14-D p	Palo Verde Mutual Water Company.	137		x			13-N p	Rice Lands of Sacramento Valley.			x		x	122
14-D p	Paradise Irrigation District.	165		x			1-H	Rincon Ditch Company.			x		x	170
14-D p	Paradise Irrigation District.		179	x			1-Q p	Riverside Area: San Bernardino Valley and—			x		x	127
14-Q p	Parker: H—Farm, El Dorado County.		181	x			1-Q	Riverside Highland Water Company.			x		x	119
13-G	Parrott and Pheasant Plant near Chico.			x			1-Q	Riverside Water Company.			x		x	140
7-G	Patterson Pump.	161		x			1-B	River Street Canal.			x		x	128
7-G	Patterson Water Company.	142		x			7-C	Riverview Farm and Water Company.			x		x	181
11-B	Paul Masson Canal.	158		x			1-Q	Rivuro Water Company.			x		x	181
7-T	Peoples Consolidated Ditch.	149		x			14-U p	Rock and Walker Creeks Area.			x		x	169
7-S	Peoples' Ditch Company.	147		x			15-A p	Round Valley Indian Reservation.			x		x	120
7-T	Persian Ditch.	149		x			16-S	Round Valley Reservoir, Plumas County.			x		x	
11-B	Pioneer Canal.	158		x			1-F	Rubio Canyon Water & Land Association.			x		x	
7-Z	Pioneer Canal.	156		x										
7-U	Pioneer Ditch.	151		x										
1-B	Pit River Water Company.	110		x										
16-I	Pit River Ditch and Dam Company.	169		x										
16-J	Pit River Valleys near Alturas.	169	180	x			13-N	Sacramento Valley: Tracts in the.			x		x	162
14-N	Placer County Fruit Lands.		180	x			12-A	Sacramento: Delta Lands of—and San Joaquin Rivers.			x		x	158
14-Q p	Placerville Area.			x			12-A p	Sacramento: Delta Lands of—and San Joaquin Rivers.			x		x	
1-M	Pomona: Farms near—	121		x			13-V p	Sacramento-Lincoln Area.			x		x	177
1-M	Pomona: Irrigation Company.	121		x			13-J	Sacramento River: Farms east of			x		x	178
1-M	Pomona: Irrigation Company of—	124		x			13-N	Sacramento River: Tracts west of			x		x	161
1-M	Pomona Ranch Water Company.	124	170	x			13-U	Sacramento Valley.			x		x	162
1-M	Pomona Valley and Cuesomanga Plains.			x			13-U p	Sacramento Valley.			x		x	164
7-U	Poplar Ditch.	151		x			13-U p	Sacramento Valley.			x		x	
13-M	Princeton-Cajon-Glen Irrigation District.		178	x			13-M	Sacramento Valley: Rice lands of			x		x	178
13-N p	Provident Irrigation District.		178	x			10-B	Sacramento Valley, West Side Canal Company.			x		x	159-161
1-I	Puente Land and Water Company.	122		x			10-C p	Salinas Valley.			x		x	157
1-B	Pumping Plains, Santa Clara River Valley.	118		x			1-H	Salinas Valley: Lower—			x		x	177
				x			1-M	San Antonio Irrigation Company.			x		x	122
				x			1-Q	San Antonio Water Company.			x		x	125
				x			1-B	San Bernardino Valley and Riverside Area.			x		x	170
				x			1-B	San Cayetano Mutual Water Company.			x		x	117
5-B	Ranch near Shelly.	138		x										

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TABLE 6—(Continued). ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

WATER RESOURCES OF CALIFORNIA.

TABLE 6.

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Section and key letter.	System or locality.	Page index.		Data.			Section and key letter.	System or locality.	Data.			Page index.	
		Measured.	Proposed.	G	N	M			G	N	M	Measured.	Proposed.
2-E	San Diego: City of—	131		x	x		16-C	Shasta Valley: Lands in—	x	x	x		182
2-D	San Diego: Mutual Water Company	123	171	x	x		5-B	Shasta Valley: Ranch near—	x	x		138	
1-L	San Dimas Water Company	119		x	x		14-P	Sierra Foothills	x	x		157	180
1-C	San Fernando Valley	122	170	x	x		11-B	Sixty Pumps, Santa Clara County	x	x		158	
1-H	San Gabriel River	121	170	x	x		16-D	Smith Canal	x	x		158	
1-G	San Gabriel Valley	121	170	x	x		16-B	Sorosis Canal	x	x		158	
1-G	San Gabriel Valley Water Company	121	170	x	x		3-H	Soule and Terwilliger Canal	x	x		136	
1-G	San Jacinto Valley & Corona Area	158		x	x		16-B	South Alamo Water Company	x	x		117	183
12-A	San Joaquin: Delta Lands of Sacramento and—			x	x		16-R	Southern California Edison Company	x	x		160-163	
12-A	San Joaquin: Delta Lands of Sacramento and—			x	x		13-Q	Southern Lassen Irrigation District	x	x		126	
7-Q	San Joaquin Valley	177		x	x		7-E	South Feather Land and Water Company	x	x		140	
7-L	San Joaquin and Kings River Canal Company	175		x	x		7-E	South Mountain Water Company	x	x		119	174
2-D	San Luis Rey to Linda Vista Area	144	171	x	x		1-B	South San Joaquin Irrigation District	x	x		166	
1-S	Santa Ana River Lands	128	170	x	x		14-O	South Yuba Ditch Company	x	x		157	
1-S	Santa Ana Valley Irrigation Company	128		x	x		10-A	South Yuba Water Company	x	x		166	
1-S	Santa Ana Valley: Twelve Systems in—	128		x	x		2-E	Speckels Sugar Co., Ranch No. 1	x	x		157	
9-D	Santa Barbara Coastal Plain	176		x	x		2-E	Spring Valley Irrigation District	x	x		171	
11-C	Santa Clara Valley	177		x	x		16-D	Spring Valley Irrigation District: La Mesa, Lemon Grove, and—	x	x		131	
1-B	Santa Clara River Valley	177		x	x		16-D	Stallcup Farm	x	x		169	
1-A	Santa Clara Water & Irrigation Company	117		x	x		11-H	Standeler Water Company	x	x		121	
9-C	Santa Maria & Cuyama Valleys	157	176	x	x		13-D	Stanford Vina Ranch	x	x		158	
9-C	Santa Maria Water Company	118		x	x		13-D	Stanford Vina Ranch	x	x		158	
1-B	Santa Paula Water Company	118		x	x		11-B	Statler Canal	x	x		158	177
1-B	Santa Paula Water Works	118		x	x		5-C	Stevens Canal	x	x		138	
1-B	Santa Ysabel: See San Luis Rey to Linda Vista Area	117		x	x		7-Z	Stine Canal	x	x		156	
1-A	Saticoy Development Company	117		x	x		7-S	Stinson Canal	x	x		148	173
1-A	Saticoy Irrigation Company	117		x	x		7-A	Stockton Area	x	x		151	
1-A	Saticoy Water Company	117		x	x		7-U	Stockton Ditch	x	x		118	
16-O	Secret Valley Irrigation District	128	182	x	x		1-B	Stringtown and Carmicle Ditch	x	x		179	
1-B	Serrano Water Association	119		x	x		13-Z	Suisun Irrigation District	x	x		179	
1-B	Sespe Land & Water Company	168		x	x		13-Z	Suisun Area	x	x		120	
16-F	Shasta County Valleys tributary to the Pit River	168	182	x	x		1-F	Sunny Slope Water Company	x	x		125	
16-F	Shasta: Little—River	168		x	x		1-N	Sunset Water Company of Cucamonga	x	x		160-163	182
16-D	Shasta: Little—Valley Springs	168		x	x		16-M	Surprise Valley Irrigation District	x	x		160-163	
	Shasta: Little—Valley Springs	168		x	x		13-R	Sutter-Butte Canal Company	x	x		160-163	

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TABLE 6.

TABLE 6—(Continued). ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Section and key letter.	System or locality.	Page index.		Data.			Page index.	
		Measured.	Proposed.	G	N	M	Measured.	Proposed.
13-B	Sutter Mutual Water Company.....	160-163		x	x	x	119	
7-T	Sweeney Ditch.....	150		x	x	x	149	
2-E	Sweetwater Water Company.....	131	171	x	x	x	150	176
2-E	Sweetwater Valley and Chula Vista Mesa.....			x	x	x		182
13-N	T							
	Tehama: Farms in—Glenn, Colusa and Yolo Counties.....							
1-R	Temescal Water Company.....	162		x	x	x	142	174
1-R	Temescal Water Company.....	128		x	x	x		174
6-F	Terra Bella Irrigation District.....		170	x	x	x	118	
6-F	Terra Bella Irrigation District.....	140		x	x	x	128	
6-F	Terra Bella Irrigation District: Lindsay-Strathmore and—		173	x	x	x	147	
1-O	Terrace Water Company.....	125	173	x	x	x	169	
16-D	Terwilliger No. 1 Canal.....	168		x	x	x	151	181
16-D	Terwilliger No. 2 Canal.....	168		x	x	x		
1-B	Thermal Belt Water Company.....	118		x	x	x		
16-I	Thermal Belt Water Company.....	169		x	x	x		
2-E	Thirty-two tracts in Pitt River.....		171	x	x	x		
1-E	The Juana Otay and—Valleys.....	120		x	x	x		
1-U	Torrance Water, Light & Power Company.....	129		x	x	x	122	
1-U	Trabuen Water Company.....	162		x	x	x	117	
13-N	Tracts in the Sacramento Valley.....	162		x	x	x	137	172
13-N	Tracts west of Sacramento River.....			x	x	x	137	
5-A	Truckee-Carson Project, U. S. R. S. (Newlands Project).....	137		x	x	x		172
5-A	Truckee-Carson Project, U. S. R. S. (Newlands Project).....		172	x	x	x	117	171

Note—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data not measured use.

TABLE 6.

TABLE 6—(Concluded.) ALPHABETICAL INDEX TO IRRIGATION SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

[illegible]

NOTE—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 7.

TABLE 7. INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Data.		Section and key letter.	System or locality under irrigation.	Page index.	
		G	N			Measured.	Proposed.
	VENTURA						
I-A	Mound Water Company.....			I-B	Hardison Ranch Company.....	118	
I-A	Southern California Edison Company.....	x	x	I-B	Turkey Ditch.....	118	
I-A	Ventura County Power Company.....	x	x	I-B	Alameda Ditch.....	118	
I-A	Del Norte Water Company.....	x	x	I-B	Interurban Land & Water Company.....	118	
				I-B	Pumping Plants, Santa Clara River Valley.....	118	
				I-B	River Street Canal.....	119	
				I-B	Walnut Irrigation District.....	119	
	MONTALVO						
I-A	Montalvo Mutual Water Company.....	x	x	I-B	Sespe Land & Water Company.....	119	
I-A	Montalvo Irrigation Company.....	x	x				
	SATICOVY						
I-A	Alta Mutual Water Company.....			I-B	Fillmore Irrigation Company.....	119	
I-A	Saticovy Development Company.....	x	x	I-B	Fillmore Water Company.....	119	
I-A	Saticovy Water Company.....	x	x	I-B	Southside Improvement Company.....	119	
I-A	Saticovy Irrigation Company.....	x	x				
I-A	Vineyard Ditch Company.....	x	x		PIRU		
I-A	Santa Clara Water & Irrigation Company.....	x	x	I-B	Piru Water Company.....	119	
	SANTA PAULA						
I-B	San Cayetano Mutual Water Company.....			I-C	San Fernando		
I-B	Santa Paula Water Works.....	x	x	I-C	San Fernando Valley.....	119	170
I-B	Santa Paula Water Company.....	x	x	I-C	San Fernando Valley.....	119	
I-B	Farmers Irrigation Company.....	x	x	I-C	Montebello Land & Water Company.....	119	
I-B	Thermal Belt Water Company.....	x	x	I-C	Haines Canyon Water Company.....	119	
I-B	Farmers Ditch Company.....	x	x	I-C	Carmel Water Company.....	119	
	SANTA CLARA RIVER VALLEY			I-C	Tujunga Water & Power Company.....	119	
I-B	Santa Clara River Valley.....	x	x		SANTA MONICA		
I-B	Carnitas Ditch.....	x	x	I-D	Ballona Irrigation Association.....	120	
I-B	Hardgrave and Comfort Ditch.....	x	x	I-D	La Riva Water Company.....	120	
I-B	Stringtown and Carmele Ditch.....	x	x	I-D	Monte Vista Pipe Line Association.....	120	

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TABLE 7.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Page index.			Data.			Page index.			Data.			Page index.		
		Measured.		Proposed.												
		G	N	M				G	N	M				G	N	M
	GARDENA															
1-E	Gardena Water Supply Company.....															
1-E	East Gardena Water Company.....		x		120											122
1-E	Moneta Water Company.....		x	x	120											122
1-E	Torrance Water, Light & Power Company.....		x	x	120											122
1-E	Bell Water Company.....		x		120											122
	PASADENA															
1-F	Consolidated Water Company.....				120											122
1-F	Crown Water Company.....		x	x	120											122
1-F	Rubio Canyon Water & Land Association.....		x	x	120											122
1-F	Sunny Slope Water Company.....		x	x	120											122
1-F	California-Michigan Land & Water Company.....		x		121											122
	SAN GABRIEL															
1-G	San Gabriel Valley.....	x														
1-G	Euclid Avenue Water Company.....		x		121											122
1-G	San Gabriel Valley Water Company.....		x	x	121											122
1-G	Garvey Water Company.....		x		121											123
	WHITTIER															
1-G	California Domestic Water Company.....				121											123
1-H	Cale Ditch Company.....		x	x	121											123
1-H	Stanfield Water Company.....		x	x	121											123
1-H	San Nicholas Water Company.....		x	x	121											123
1-H	Whittier Water Company.....		x	x	121											123
1-H	Banta Ditch Association.....		x	x	122											123
1-H	Rincon Ditch Company.....		x	x	122											123
1-H	Whittier Extension Mutual Water Company.....		x	x	122											123
1-H	San Gabriel River.....		x	x	122											123
1-H	Valley View Water Company.....		x		122											123
	PUENTE															
	Boulevard Water Company.....															
	Mission View Acres.....		x													
	Fruitland Water Company.....		x	x												
	Arroyo Ditch and Water Company.....		x	x												
	San Antonio Irrigation Company.....		x	x												
	PUENTE															
	Puente Land & Water Company.....		x													
	Little Lake Ditch.....															
	BALDWIN PARK															
	Baldwin Park Water Company.....		x													
	COVINA															
	Columbia Land & Water Company.....		x	x												
	Covina Irrigation Company.....		x	x												
	Land near Covina.....															
	DUARTE															
	Duarte Mutual Irrigation & Canal Company.....		x	x												
	Beardslee Water Ditch Company.....		x	x												
	Walnut Grove Mutual Water Company.....		x	x												
	AZUSA															
	Azusa Irrigation Company.....		x													
	GLENDORA															
	Glendora Irrigation Company.....		x	x												
	Glendora Mutual Water Company.....		x													

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TABLE 7

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Data.		Page index.		Section and key letter.	System or locality under irrigation.	Data.		Page index.			
		G	N	M	Measured.			Proposed.	G	N	M	Measured.	Proposed.
1-L 1-L	SAN DIMAS San Dimas Water Company..... La Verne Irrigation Company.....		x	x		123 123	1-M 1-N		x	x	125 125		
1-L	CLAREMONT Claremont Cooperative Water Company.....		x	x		123	1-N 1-N 1-N		x	x	125 125 125		
1-L	LA VERNE La Verne Land & Water Company.....		x	x		123	1-N		x	x	125		
1-M 1-M 1-M 1-M 1-M 1-M 1-M 1-M	POMONA Irrigation Company of Pomona..... Del Monte Irrigation Company..... Palomares Irrigation Company..... Pomona Irrigation Company..... Farms near Pomona..... Pomona Ranch Water Company..... Canyon Water Company..... Pomona Valley & Cucamonga Plains.....		x	x		124 124 124 124 124 124 124 124	1-N 1-N		x	x	125 125		
1-M	CHINO Chino Water Company.....		x	x		124	1-O 1-O		x	x	125 125		
1-M 1-M	ONTARIO San Antonio Water Company..... Monte Vista Irrigation Company.....		x	x		125 125	1-O 1-O		x	x	126 126		

Note—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data as measured use.

TABLE 7.

Section and key letter.	System or locality under irrigation.	Page index.				Section and key letter.	System or locality under irrigation.	Page index.				Data.	System or locality under irrigation.	Page index.				Data.	Page index.	
		Measured.		Proposed.				Measured.		Proposed.				Measured.	Proposed.					
		G	N	M				G	N	M										
1-O	RIALTO Lytle Creek Water & Improvement Company...																			
1-O	HIGHLANDS City Creek Water Company																			
1-P	REDLANDS Bear Valley Mutual Water Company...																			
1-P	Laguna Water Company																			
1-P	South Mountain Water Company																			
1-P	MENTONE Mentone Irrigating Company																			
1-P	RIVERSIDE San Bernardino Valley and Riverside Area...																			
1-Q	Gage Canal																			
1-Q	West Riverside Canal Company																			
1-Q	Riverside Water Company																			
1-Q	Riverside-Highland Water Company																			
1-Q	Rivino Water Company																			
1-R	YORBA LINDA Yorba Linda Water Company																			
1-R	CORONA Temescal Water Company																			
1-R	Temescal Water Company																			
1-R	San Jacinto Valley and Corona Area																			
	BEAUMONT Beaumont Irrigation District																			
	YUCAIPA Yucaipa Water Company No. 1																			
	Yucaipa Valley & San Geronimo Pass																			
	HERMOSA Hermosa Water Company																			
	Orange County Coastal Plain and Mesa																			
	CAPISTRANO Capistrano Water Company																			
	Trabuco Water Company																			
	YUCAIPA Yucaipa Water Company No. 1																			
	Yucaipa Valley & San Geronimo Pass																			
	BEAUMONT Beaumont Irrigation District																			

NOTE.—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

TABLE 7.

Section and key letter.	System or locality under irrigation.	Page index.		Data.			Page index.	
		Measured.	Proposed.	G	N	M	Measured.	Proposed.
	HOLTVILLE							
3-G	Imperial Water Company No. 5	134		x	x	x	137	172
3-G	Imperial Water Company No. 7	135		x	x	x	137	172
3-G	Imperial South Side Water Company	135		x	x	x	137	172
	CALEXICO							
3-H	Imperial East Side Water Company	136		x	x	x	137	172
3-H	South Alamo Water Company	136		x	x	x	137	172
3-H	Imperial Water Company No. 6	136		x	x	x	137	172
	BARD							
3-I	Yuma Project, U. S. R. S.	136	171	x	x	x	138	172
3-I	Yuma Project, U. S. R. S.	136	171	x	x	x	138	172
	BLTYHE							
3-J	Palo Verde Mutual Water Company	137		x	x	x	138	172
	PALMDALE							
4-A	Palmdale Water Company	137	172	x	x	x	138	172
4-A	Palmdale Water Company	137	172	x	x	x	138	172
4-A	Palmdale Irrigation District	137	172	x	x	x	138	172
	LITTLE ROCK							
4-B	Little Rock Irrigation District	137		x	x	x	139	172
4-C	Appleton Land, Water & Power Company	137		x	x	x	139	172
	VICTORVILLE							
4-D	Mojave River Irrigation District	137		x	x	x	139	172

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TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

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TABLE 7.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Page index.			Data.			Section and key letter.	System or locality under irrigation.	Page index.			Data.			Section and key letter.	System or locality under irrigation.	Page index.		
		Measured.	Proposed.		G	N	M			Measured.	Proposed.		G	N	M			Measured.	Proposed.	
VISALIA																				
6-C	Foothill Ditch Company.....		139		x			7-C	West Side Irrigation District.....		139		x			140	173			
6-D	Marks and Rice Ditch.....		139		x			7-C	West Side Irrigation District.....		139		x			140	173			
6-D	Lemon Cove Ditch.....		139		x			7-C	Byron-Bethany Irrigation District.....		139		x			140	173			
6-D	Merryman Ditch.....		139		x			7-C	Byron-Bethany Irrigation District.....		139		x			140	173			
6-E	Lindsay-Strathmore Irrigation District.....		173		x	x	x	7-C	Byron-Bethany Irrigation District.....		173		x	x	x	140	173			
6-E	Lindsay-Strathmore Irrigation District.....		173		x	x	x	7-C	Byron-Bethany Irrigation District.....		173		x	x	x	140	173			
6-E	Lindsay Water Development Company.....		139		x			7-C	Naglee-Burke Irrigation District.....		139		x			140	173			
TERRA BELLA																				
6-F	Terra Bella Irrigation District.....		140		x	x	x	7-C	Naglee-Burke Irrigation District.....		140		x			140	173			
6-F	Terra Bella Irrigation District.....		140		x	x	x	7-C	Kasson Irrigation District.....		140		x			140	173			
6-F	Lindsay-Strathmore and Terra Bella Irrigation Districts.....		173		x			7-C	Riverview Farm and Water Company.....		173		x			140	173			
LODI																				
7-A	Woodbridge Area, U. S. R. S.....		173		x			7-D	Banta-Carbena Irrigation District.....		173		x			140	174			
STOCKTON																				
7-A	Stockton Area.....		173		x			7-D	West Stanislaus Irrigation District.....		173		x			140	174			
KNIGHTSEN																				
7-B	Lone Tree Irrigation District.....		173		x			7-E	South San Joaquin Irrigation District.....		173		x	x	x	141	174			
7-B	Knightsen Irrigation District.....		173		x			7-E	South San Joaquin Irrigation District.....		173		x	x	x	141	174			
BRENTWOOD																				
7-B	East Contra Costa Irrigation Company.....		140		x	x	x	7-F	Modesto Irrigation District.....		140		x	x	x	142	142			

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TABLE 7.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Data.			Page index.		Section and key letter.	System or locality under irrigation.	Data.			Page index.	
		Data.			Measured.	Proposed.			Data.			Measured.	Proposed.
		G	N	M					G	N	M		
7-H ^p	Turlock Irrigation District.....	x	x	x		174	7-M	East Side Canal.....	x			145	
7-H	Turlock Irrigation District.....	x	x	x		174	7-M	Columbia Canal.....		x		145	
7-H ^r	Modesto and Turlock Irrigation Districts.....	x	x	x									
7-I ^p	American Seedless Raisin Company.....	x	x		144	174	7-O	James Pump, Fresno Slough.....		x		145	
7-I	American Seedless Raisin Company.....	x	x				7-P	James Irrigation District.....		x		145	
							7-P	Long Tree Canal.....		x		145	
							7-P	Fresno Canal.....		x		146	
							7-P	Gould Canal.....		x		146	
							7-P	Fresno-Gould Canal.....		x		146	
							7-Q	Alta Irrigation District.....		x		146	175
7-I ^p	Merced Irrigation District.....	x	x		144	174	7-Q	King's River Areas.....		x			175
7-I	Crocker-Huffman Land & Water Company.....	x	x				7-Q	San Joaquin Valley.....		x		146	175
							7-R	Consolidated Canal Company.....		x		147	175
							7-R	Farms near Reedley.....		x			175
							7-R	Island No. 3, Consolidated and Los Emigrants.....		x			175
7-J ^p	California Packing Corporation.....	x	x			175	7-R	Island No. 3 Irrigation District.....		x		147	
7-J	Medano Irrigation Project.....	x	x			174	7-R	Consolidated Irrigation District.....		x		147	
7-K ^p	Chowchilla Irrigation District (Projected).....	x	x			175	7-S	Emigrant Canal.....		x		147	
7-L	San Joaquin & Kings River Canal Company.....	x	x	x	144		7-S	Island Canal.....		x		147	
7-L	Miller & Lux Canal.....	x	x		144		7-S	Beth Main Canal.....		x		147	
							7-S	Peoples Ditch Company.....		x		147	
							7-S	"A" Canal.....		x		147	
							7-S	Grant Canal.....		x		147	
7-L	Farms in vicinity of Mendota.....	x	x		143		7-S	Turkey-Riverdale Canal.....		x		147	
7-L	Brown Slough.....	x	x		144		7-S	Crescent Canal.....		x		147	
7-L	Aliso Canal.....	x	x		144		7-S	Stinson Canal.....		x		148	
7-L	Chowchilla Canal.....	x	x		145		7-S	Cuthbert-Burrell Canal.....		x		148	
7-L	Merced Canal.....	x	x		145		7-S	East Chance Water Ditch Company.....		x		148	
							7-S	Mill Races.....		x		148	
							7-S	Reed Canal.....		x		148	
							7-S	Liberty Canal.....		x		148	
7-M ^p	Madera Irrigation District.....	x	x			175	7-S	Laguna Irrigation District.....		x		148	
7-M	Madera Canal and Irrigation Company.....	x	x		145		7-S	Lake Lands Canal.....		x		148	
7-M	Blythe Canal.....	x	x		145		7-S	Kings River Conservancy District.....		x		148	175

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TABLE 7.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Page index.		Data.			Page index.	
		G	N	M	Measured.	Proposed.	Measured.	Proposed.
8-A 8-B 8-C	MENDOTA Eisner and Alexander Farm. West Side San Joaquin Valley. Boston Land Company.							
			x		157		157	
		x			157			
9-A 9-B	COALINGA ATASCADERO Atascadero Colony.							
9-A 9-B	ATASCADERO Atascadero Colony.							
9-A 9-B	ARROYO GRANDE McNiel Irrigation Company.							
9-A 9-B	SANTA MARIA Santa Maria Water Company. Santa Maria & Coyama Valleys.							
9-A 9-B	SANTA BARBARA Santa Barbara Coastal Plain Governador Land & Water Company.							
9-A 9-B	SALINAS Streckels Sugar Company, Ranch No. 1. Salinas Valley. Lower Salinas Valley.							
9-A 9-B	NILES Alameda County Water District.							
9-A 9-B	SAN JOSE Sixty pumps, Santa Clara County. Phoenix Canal. Sorsosa Canal. Kirk Canal. Paul Messini Canal. Stadler Canal. Santa Clara Valley.							
9-A 9-B	GILROY Pajaro Valley Pumping Plants.							
9-A 9-B	Delta Lands of Sacramento and San Joaquin Rivers. Delta Lands of Sacramento and San Joaquin Rivers.							
9-A 9-B	REDDING Anderson-Cottonwood Irrigation District. El Camino Irrigation District. El Camino Irrigation District.							
9-A 9-B	TEHAMA Los Molinos Area. Los Molinos Land Company (Coneland Water Co.). Los Molinos Land Company (Coneland Water Co.).							

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TABLE 7.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Data.			Section and key letter.	System or locality under irrigation.	Page index.			Data.			Page index.	
		G	N	M			Measured.	Proposed.	G	N	M	Measured.	Proposed.	
COLUSA—Continued.														
13-N	Tracts in the Sacramento Valley.													
13-Q	Alcira Mutual Water Company.	x		x			162					x	165	179
13-Q	Farm Land Investment Company.	x					163					x		
13-Q	Cordina Irrigation District.		x				163							
13-Q	South Feather Land & Water Company.	x	x	x			163							
13-R	Sutter Mutual Water Company.	x	x	x			163							179
13-R	Sutter-Battle Creek Company.	x	x	x			163							179
13-S	Farms between Marysville and Wheatland.	x		x			163							
MARYSVILLE														
13-T	Reclamation District No. 108.	x		x			163							
WOODLAND														
13-X	Yolo Water and Power Company.		x				164						165	179
(End of Rice Data.)														
NICOLAUS														
13-U	Sacramento Valley.			x			164						165	179
13-U	Sacramento Valley.							178						
13-V	Sacramento Valley.	x						178						
13-W	Sacramento-Lodi Area.	x		x			164							
13-W	National Company of California.	x		x										
SACRAMENTO														
13-X	Farms near Woodland.			x			164							
13-X	Moore Ditch, Yolo County.			x			164							
13-X	Yolo Water & Power Company.	x		x			164							179
13-X	Yolo Water & Power Company.	x		x				178						
13-X	Woodland Area.	x		x				179						
WOODLAND														
13-Y	Dixon Area.													
13-Y	East Dixon Irrigation and Drainage Association.													
DIXON														
13-Z	Suisun Irrigation District.													
13-Z	Suisun Area.													
SUISUN														
MAXWELL														
14-A	Jus. Mills Orchards Corporation.													
14-A	Jus. Mills Orchards Corporation.													
14-B	Elmer Creek Area.													
14-C	Happy Valley Irrigation District.													
14-C	Happy Valley Irrigation District.													
OLINDA														
14-D	Paradise Irrigation District.													
14-D	Paradise Irrigation District.													
14-E	Pacific Gas & Electric Company, 8 miles north of Oroville.													
14-E	Oro Water, Light & Power Company.													
14-E	Pacific Gas & Electric Company near Oroville.													
14-E	Oroville Water Company.													
OROVILLE														
14-F	Oroville-Wyandotte Irrigation District.													
14-G	Palermo Land & Water Company.													

Notes:—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 7

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Page index.			Data.			Section and key letter.	System or locality under irrigation.	Page index.			Data.			Section and key letter.	System or locality under irrigation.	Page index.		
		Measured.	Proposed.		G	N	M			G	N	M	Measured.	Proposed.				G	N	M	Measured.	Proposed.
14-G	OROVILLE—Continued. Palermo Land & Water Company Honcut-Yuba Irrigation District		179																180	
14-H				179	x	x			x	x					x	x		107	180	
14-I	HONCUT Lands under Grizzly Creek, Butte and Yuba counties																		181	
14-J									x	x					x	x			181	
14-K	NEVADA CITY Newtown Ditch		166					x	x					x	x		167	181		
14-L				166					x	x					x	x			181	
14-M	NEVADA CITY Excelsior Water & Mining Company Nevada Irrigation District		180																181	
14-N									x	x					x	x			181	
14-O	NEVADA CITY Brown Valley Canal		166																181	
14-P					x	x			x	x					x	x		167	181	
14-Q	NEVADA CITY Los Vepels Land & Water Company		166					x	x					x	x		167	181		
14-R				166					x	x					x	x			181	
14-S	NEVADA CITY Feather River Valley Farms																		181	
14-T																			181	
14-U	NEVADA CITY Yuba, Nevada, Sutter, Water and Power Association		180					x	x					x	x				181	
14-V				180					x	x					x	x			181	
14-W	MARYSVILLE Feather River Area																		181	
14-X																			181	
14-Y	MARYSVILLE Coon Creek Area		180																181	
14-Z					x	x			x	x					x	x		167	181	
14-A	MARYSVILLE Placer County Fruit Lands		180																181	
14-B					x	x			x	x					x	x			181	
14-C	MARYSVILLE Pacific Gas & Electric Company, Placer County		166																181	
14-D				166					x	x					x	x			181	
14-E	MARYSVILLE Bear River Water Company		166																181	
14-F				166					x	x					x	x			181	
14-G	MARYSVILLE South Yuba Ditch Company																		181	
14-H									x	x					x	x			181	
14-I	MARYSVILLE South Yuba Water Company		166																181	
14-J									x	x					x	x			181	

NOTE—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 7.

TABLE 7—(Continued). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Page index.				Data.			Page index.	
		Measured.		Proposed.		G	N	M	Measured.	Proposed.
15-B	MONTICELLO Rancho Lenora, Berryessa Valley.....		167			x	x	x	168	
15-C	NAPA Napa Valley.....		167			x	x	x	168	
	KLAMATH FALLS Klamath Project, U. S. R. S..... Klamath Project, U. S. R. S..... Klamath River Lands.....					x	x	x	168	
16-A	YREKA Cottonwood Irrigation & Mining Company.....		167	182		x	x	x	168	182
16-B	GRENADA Grenada Irrigation District..... Lands in Shasta Valley..... Little Shasta River..... Little Shasta Valley Springs..... Terwilliger No. 1 Canal.....		168	182		x	x	x	169	182
16-C	BURNEY Shasta County Valleys tributary to the Pit River.....					x	x	x	182	
16-D	BIEBER Big Valley, Lassen County..... Modoc and Lassen County Valleys tributary to the Pit River..... Pit River Ditch & Dam Company..... Thirty-two tracts on Pit River.....					x	x	x	182	
16-E	ALTURAS Pit River Valleys near Alturas.....					x	x	x	169	

Note—"x" in columns under G, N, or M indicates whether the collected data consists of (G) gross annual use, (N) net annual use, or (M) monthly use. (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 7.

TABLE 7—(Concluded). INDEX BY SECTIONS AND KEY LETTERS ON MAP, PLATE V, TO SYSTEMS LISTED IN TABLES 8 AND 9 ON USE OF WATER.

Systems Lie Approximately on Line Between Consecutive Towns as Listed.

Section and key letter.	System or locality under irrigation.	Section and key letter.	System or locality under irrigation.	Page index.			Data.			Page index.	
				Measured.	Proposed.		G	N	M	Measured.	Proposed.
16-K p 16-L	LIKELY Crooks Canyon Irrigation District..... Jess Valley.....	16-P 16-Q p 16-Q p 16-Q p	SUSANVILLE Lassen Irrigation Company..... Tule Irrigation District..... Honey Lake Valley Irrigation District..... Honey Lake Valley.....	169	182		x	x	x	169	182 182 183
16-M p	CEDARVILLE Surprise Valley Irrigation District.....	16-R p 16-R p	DOYLE Long Valley Creek Irrigation District..... Southern Lassen Irrigation District.....	169	182		x	x	x	169	183 183
16-N	MADELINE Union Land & Stock Company.....		GREENVILLE Round Valley Reservoir, Plumas County.....	169	182		x			169	
16-O p	KARLO Secret Valley Irrigation District.....						x				

Note—"x" in columns under G, N, or M indicates whether the collected data consists of Gross annual use, Net annual use, or Monthly use (p) Indicates data on proposed use. Lines not marked (p) refer to data on measured use.

TABLE 8.

TABLE 8. USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.														
			Gross.				Trees.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.				
			Feet.	Net.																		Alfalfa.	P. ct.	P. ct.	P. ct.
1-A	Mound Water Co. (a) (b).....	792	1.00	.....	.....	1918	.....	30.3	.....	69.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Southern California Edison Co. (a) (b)...	3,000	2.78	.....	.....	1918	.....	28.3	.....	71.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Ventura County Power Co. (a).....	3,000	2.70	.....	.....	1909	.....	28.0	.....	72.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Del Norte Water Co. (a) (b).....	3,365	0.06	.....	.....	1918	.....	.....	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Montalvo Mutual Water Co. (a).....	906	0.80	.....	.....	1918	.....	51.3	.....	48.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Montalvo Irrigation Co. (a).....	126	1.27	.....	.....	1918	.....	92.0	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Alta Mutual Water Co., Saticoy (a).....	380	.....	.....	.....	1918	.....	.....	.....	8.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Saticoy Development Co.	550	.....	05	.....	1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		528	1.27	.....	.....	1918	.....	96.3	.....	3.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Saticoy Water Co. (e).....	150	0.67	.....	.....	1909	.....	50.0	.....	50.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Saticoy Irrigation Co. (a).....	450	1.00	.....	.....	1909	.....	56.0	.....	44.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Vineyard Ditch Co. (a).....	400	0.63	.....	.....	1909	.....	.....	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-A	Santa Clara Water and Irrigation Co. (a)	3,600	2.70	.....	0.50	.....	.....	3.0	8.5	.....	88.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1,734	.....	.....	.....	.....	.....	2.3	20.1	.....	77.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		4,414	1.42	.....	.....	.....	.....	3.9	12.1	.....	84.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		2,900	.....	0.73	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		3,525	.....	0.93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		3,909	.....	1.12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		75,500	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		3,070	1.29	.....	.....	.....	.....	.....	.....	.....	82.2	0.5	2.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-B	San Cayetano Mutual Water Co. (a)...	452	1.58	.....	.....	1918	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Remarks--(a) From U. S. D. A. data collected by C. E. Tait. (b) Irrigation near Ventura. (c) Water used 14 months; quantity unknown. (d) May 1 to Aug. 15. (e) From An. Rpt. of company to State R. Comm. (f) From 4th Bien. Rpt., State Dept. of Eng. (g) From O. E. S. Bull. 251, U. S. D. A., by Frank Adams. Estimated from loss of 30 per cent. (h) Saticoy division. (i) Estimated. (z) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																	
			Gross.	Net.			Alfalfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.						
1-B	Santa Paula Water Works.....	1,628	1.89	b1.70	b10.0	a1912			100.0						11.0	19.0	20.0	16.0	13.0	11.0	10.0							
		1,325	1.47	c1914								4.1	1.4	4.4	9.5	11.5	12.7	12.0	12.6	10.0	7.8	7.0						
		1,325	1.38	c1915								9.3	0.9	0.8	9.8	5.1	13.4	13.9	11.8	9.9	8.6	8.3						
		1,325	1.33	c1916								0.6	0.3	5.3	12.4	18.6	10.3	18.1	11.9	10.5	0.8	2.1						
		1,325	1.03	c1917								3.8	1.4	2.9	19.0	20.1	20.4	10.0	8.8	3.4	4.6	5.3						
		1,325	1.35	c1918								3.8	1.9	0.0	7.4	20.3	20.0	17.0	7.8	9.0	8.8	4.0						
		1,325	0.89	c1919								2.1	8.7	15.9	24.4	9.6	6.7	6.8	5.2	3.0	3.2	9.2						
		1,325	0.80	c1920								9.4	11.1	13.0	19.0	13.1	6.9	6.5	4.5	5.4	3.1	2.0						
1-B	Santa Paula Water Co. (d).....	200				1909			100.0																			
1-B	Farmers' Irrigation Co.....	4,200		1.50		c1919										14.2	15.2	17.7	16.1	11.1	8.4	1.5						
		4,200		1.76		1920						4.9	6.4	1.8														
1-B	Thermal Belt Water Co.....	5,000		.52		1909										10.1	7.2	11.7	11.1	4.1	2.6	10.7						
		1,575		2.49		d1918			100.0																			
1-B	Farmers' Ditch Co. (d).....	7,590				1918		25.0	25.0																			
1-B	Canulus Ditch (e) (a).....	400	4.27	b3.42	b20.0	1912		37.5	62.5																			
1-B	Hardgrave and Comfort Ditch (e) (a)...	470	5.50	b4.12	b25.0	1912		24.5	0.1																			
1-B	Stringtown and Carmicle Ditch (e) (a)...	350	5.87	b4.70	b20.0	1912		100.0																				
1-B	Hardison Ranch Co. (e) (a).....	109	1.39	b1.33	b5.0	1912		1.8	84.4																			
1-B	Turner Ditch (e) (a).....	187	7.98	b5.59	b30.0	1912		6.4	72.7																			
1-B	Altmore Ditch (e) (a).....	150	4.65	b3.72	b20.0	1912		73.4	26.6																			
1-B	Interurban Land and Water Co. (c)....	d1,600		0.82		1909																						
		f1,112		b1.07	b20.0	a1912																						
		g1,536		g2.32	b30.0	a1912																						
1-B	Pumping plants (a) (e).....	2,471		0.55		1912			69.6																			

REMARKS—(a) From 4th Bien. Rpt., State Dept. of Eng. (b) From O. E. S. Bull. 254, U. S. D. A. Estimated by Frank Adams. (c) From Rpt. of company to State R. R. Comm. (d) From U. S. D. A. data collected by C. E. Tait. (e) Irrigation in Santa Clara River Valley. (f) Carmicle Ditch. (g) River Street Ditch. (x) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.												
			Gross.	Net.			Alfalfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Acres.	Feet.	Feet.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
1-B	River Street Canal, Santa Clara Valley (a)	1,536	2.30			1912	13.0	82.5		4.5					19.0	23.0	13.0	21.0	21.0	3.0			
1-B	Walnut Irrigation Dist. (b)	850		1.61		1909	23.0	77.0							16.6	16.8	16.8	16.6	16.6	16.6			
1-B	Sespe Land and Water Co. (a) (d)	40	15.10	e12.08	20.0	1912	100.0								16.0	47.0	16.0	12.0	9.0				
1-B	Fillmore Irrigation Co.	1,674 1,160	2.00	e1.70 3.71	e15.0 e1918		3.5	96.5 99.0						f	13.0	25.0	20.0	14.0	14.0	14.0			
1-B	Fillmore Water Co. (e)	1,200		3.50		1909	8.0	75.0		17.0													
1-B	Southside Improvement Co.	1,400 1,450	0.76 f2.23	e0.68	e10.0 e1918			100.0							13.0	20.0	22.0	18.0	15.0	12.0			
1-B	Piru Water Co. (d)	e254 376 p224	4.00 3.77 9.53	e3.30	e10.0 1919			100.0							9.0	19.0	22.0	21.0	21.0	8.0			
1-C	San Fernando Valley (h) (i)	61,600		1.31		1920																	
1-C	Montebello Land and Water Co. (e) (k)	1,000 1,200		2.25 p0.99		1909 1918	50.0	50.0 90.0															
1-C	Haines Canyon Water Co. (k) (m)	e550		e40.61		1917 1918 1919 1920		e54.5 e54.5		e45.5					1.0 5.7 13.2 14.3	5.1 13.7 15.8 17.9	22.1 17.9 15.8 16.8	11.9 10.6 10.5 19.8	15.8 10.4 17.8 15.1	13.8 5.3 3.5 15.2	2.7 0.8 5.7 8.2	4.3 0.8 0.7 2.0	
1-C	Carmel Water Co. (e) (n)	1,000 1,000		1.55 0.40		1909 1918	12.5	75.0		12.5					p								
1-C	Tujunga Water and Power Co. (k) (e)	1,000		1.00		1918	25.0	50.0		25.0													

REMARKS—(a) From 4th Bienn. Rpt., State Dept. of Eng. (b) Citrus belt, San Gabriel River. (c) From O. E. S. Bull. 254, U. S. D. A., by Frank Adams. Estimated use. (d) Irrigation in Santa Clara River Valley. (e) From U. S. D. A. data collected by C. E. Tat. (f) On basis of 6 months irrigation. (g) River Street Ditch. (h) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (i) Irrigated from the Los Angeles River. (j) About 4.5 per cent domestic use. (k) San Fernando Valley. (l) About 13 per cent domestic use. (m) From An. Rpts. of company to State R. R. Comm. (n) Citrus belt of Los Angeles River. (p) Water used 7 months; quantity unknown. (r) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees and vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
1-D	Ballona Irrigation Assn. (a) (b).....	1,000 1,000	..... .....	1.44 1.30	..... .....	1909 1918	..... .....	100.0.....	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........
1-D	La Rica Water Co. (a) (b).....	120	.....	1.74	.....	1918	.....	33.0	.....	.....	67.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-D	Monte Vista Pipe Line Assn. (a) (d)...	371	.....	1.24	.....	.....	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-E	Gardena Water Supply Co. (a) (b).....	500	.....	1.44	.....	1918	.....	4.0	.....	.....	96.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-E	East Gardena Water Co. (a) (b).....	300 480	..... .....	..... .....	..... .....	1909 1918	..... .....	..... 10.5	..... .....	..... .....	..... 89.5	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........
1-E	Moneta Water Co. (a) (b).....	450	.....	2.00	.....	1909	.....	50.0	.....	.....	50.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-E	Torrance Water, Light and Power Co. (b) (f).....	735	.....	1.86	.....	1918	.....	10.2	2.0	.....	87.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		275	.....	0.50	.....	1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		425	.....	0.60	.....	1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		400	.....	0.60	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		250	.....	0.50	.....	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		250	.....	1.00	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-E	Bell Water Co. (a) (b).....	100	.....	1.30	.....	1918	.....	.....	.....	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-F	Consolidated Water Co., Pasadena (a) (g) (h).....	400	.....	1.42	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-F	Crown Water Co., Pasadena (a) (h)....	12 50	..... .....	5.00 1.47	.....	1909 1919	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........
1-F	Rubio Canyon Water and Land Assn. (h)	100	.....	3.35	.....	1909	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-F	Sunny Slope Water Co. (a) (d).....	700 1,400	..... .....	1.08 1.02	.....	1909 1918	..... .....	70.0 1.8	73.2	.....	30.0 25.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS—(a) From U. S. D. A. data collected by C. E. Taft. (b) Coastal Plain of Los Angeles County, Los Angeles River. (c) Water used 783 hours; monthly amounts unknown. (d) San Fernando Valley. (e) Water used for 6 months; monthly amounts unknown. (f) From An. Rpt. of company to State R. R. Comm. (g) Water from Precipice Canyon. (h) Citrus belt of San Gabriel River. (i) Citrus. (j) Truck and gardens. (k) San Fernando Valley. (l) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated. Acres.	Annual use in depth on land.		Loss of diverted water in conveyance. P. ct.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Area of crops in per cent of total.				Alfalfa. P. ct.	Trees, Vines. P. ct.	Grain. P. ct.	Misc. P. et.	Jan. P. et.	Feb. P. et.	Mar. P. et.	Apr. P. et.	May P. et.	June P. et.	July P. et.	Aug. P. et.	Sept. P. et.	Oct. P. et.	Nov. P. et.	Dec. P. et.		
1-F	Calif.-Mich. Land and Water Co. (a) (b)	700	Feet.	1.00		1918																		
1-G	Euclid Ave. Water Co. (b) (c)	150	Feet.	1.68		1909																		
1-G	San Gabriel Valley Water Co. (c) (d)	415	Feet.	1.90		1913																		
		415	Feet.	1.64		1914						4.9	0.3	0.4	2.4	13.2	12.0	13.0	17.6	20.8	11.0	3.9	0.5	
		415	Feet.	1.57		1915						0.3	0.3	0.8	2.9	5.9	17.8	30.3	17.4	14.8	12.5	5.4	1.6	
		415	Feet.	1.48		1916						0.2	0.2	0.3	3.0	14.7	16.3	18.7	21.2	20.4	1.7	1.8	1.5	
		645	Feet.	0.92		1917						0.1	0.1	0.6	3.2	10.0	13.8	13.9	17.3	12.2	15.8	6.5	0.5	
		670	Feet.	0.91		1918						4.1	2.2	0.5	3.7	14.4	15.2	15.5	15.8	10.4	2.7	6.6	1.0	
		832	Feet.	0.90		1919						5.3	0.7	1.0	4.2	11.4	16.7	17.6	16.5	18.4	2.6	4.7	0.8	
		910	Feet.	1.11		1920						1.5	2.4	0.7	2.3	9.7	14.6	17.5	16.7	13.3	12.4	4.7	4.2	
1-G	Garvey Water Co. (b) (c)	315	Feet.	0.68		1919																		
1-G	California Domestic Water Co. (c)	10,000	Feet.	2.17		1909																		
		3,000	Feet.	1.57		1918																		
1-H	Cate Ditch Co. (f)	13,300	Feet.			1909																		
		1,350	Feet.	2.40		1913																		
			Feet.			1918																		
1-H	Standefer Water Co. (c)	1,375	Feet.	1.86		1909																		
		1,268	Feet.	1.60		1913																		
1-H	Los Nietos Irrigation Co. (f)	1,500	Feet.	2.00		1913																		
		61,298	Feet.	2.77		1918																		
1-H	Whittier Water Co. (d) (f)	2,500	Feet.	0.71		1915																		
		4,400	Feet.	0.59		1916																		
		4,400	Feet.	0.97		1917																		
		4,400	Feet.	0.69		1918																		
		4,500	Feet.	0.79		1919																		
		4,500	Feet.	0.96		1920																		

REMARKS:—(a) Coastal Plain of Los Angeles County, Los Angeles River. (b) From U. S. D. A. data collected by C. F. Tait. (c) Citrus belt of San Gabriel River. (d) From An. Rpts. of company to State R. R. Comm. (e) From 4th Bien. Rpt., State Dept. of Eng. (f) Coastal Plain of Los Angeles County, San Gabriel River. (g) From measurements by F. C. Finkle, Los Angeles.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth of water in land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.															
			Gross.				Alfalfa.	Trees and Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.				
			Feet.	Nct.																			P. ct.	P. ct.	P. ct.	P. ct.
1-H	Banta Ditch Assn. (a) (b).....	1,000	Feet.	1.00		1918			100.0																	
1-H	Rincon Ditch Co. (a) (b).....	900		1.56		1909																				
		901		1.50		1918			90.0		10.0															
1-H	Whittier Extension Mutual Water Co. (a) (b).....	2,000		1.50		1918			100.0																	
1-H	San Gabriel River (d).....			2.50								100.0														
1-H	Valley View Water Co. (a) (e).....	80		3.20		1909											16.6	16.8	16.8	16.6	16.6	16.6				
1-H	Boulevard Water Co. (a) (e).....	300				1918		16.7	58.3	25.0						f										
1-H	Mission View Acres (a) (e).....	200		1.20		1909						100.0														
1-H	Fruitland Water Co. (a) (e).....	125		0.96		1909						100.0														
1-H	Arroyo Ditch and Water Co. (a) (b).....	4,000		1.98	10.0	1909		50.0	50.0																	
		4,000		2.00		1918		37.5	62.5								20.4	20.4	16.6	15.4	13.6	13.6				
1-H	San Antonio Irrigation Co. (a) (b).....	1,500		0.60		1909						33.3														
		1,200		2.00		1918		66.7																		
1-I	Puente Land and Water Co. (a) (e).....	1,000		1.20		1918		20.0	74.0		6.0															
1-I	Little Lake Ditch (g) (e).....					1913																				
1-J	Baldwin Park Water Co. (a) (e).....	269		1.02		1918			61.7		38.3						24.2	37.6	4.0	11.6	1.3	9.3	12.0			
1-J	Columbia Land and Water Co. (e).....	600		0.78		1919			100.0																	
1-J	Covina Irrigation Co. (a) (e).....			0.62		1911					2.6						2.5	16.5	16.5	14.5	11.5	9.5	9.2	8.3	8.9	
		5,000		0.65		1912					3.9	6.6	1.4	7.9	16.0	14.6	10.6	9.0	7.9	7.8	6.9	7.2				
		5,000		0.58		1913					3.8	1.5	3.2	16.0	17.0	9.8	10.5	10.8	10.7	10.7	10.7	10.7	3.8			
		4,500		1.30		1918			100.0																	

REMARKS—(a) From U. S. D. A. data collected by C. E. Tait. (b) Coastal Plains of Los Angeles County, San Gabriel River. (c) Strawberries. (d) From T. D. Allin, Pasadena. (e) Citrus belt of San Gabriel River. (f) Water used 7 months; quantity unknown. (g) From measurements by F. C. Finkle, Los Angeles. (x) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.											
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Feet.	Feet.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.		
1-J	Lands near Covina (a).....	1 48	.....	.....	.....	.....	.....	100.0	.....	.....	2.7	.....	.....	2.7	15.2	16.3	14.9	11.5	9.4	9.4	8.1	8.8
		1.70	.....	.....	.....	.....	.....	100.0	.....	.....	3.5	5.9	1.2	14.7	14.7	13.5	10.0	8.2	8.2	7.1	6.5	6.5
		1.39	.....	.....	.....	.....	.....	100.0	.....	.....	4.2	2.2	3.6	16.6	17.3	8.6	10.1	10.8	10.8	10.8	3.6	1.4
1-K	Duarte Mutual Irrigation and Canal Co. (b) (c).....	1,259	.....	1 20	.....	1918	100 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-K	Beardslee Water Ditch Co. (b) (c).....	400	.....	0 90	.....	1909	6 0	86.5	.....	7.5	.....	.....	.....	.....	4.8	4.8	33.5	22.4	17.3	17.2	.....	.....
		1,110	.....	0 70	.....	1918	2 2	73 0	.....	24.8	.....	.....	.....	.....	d	.....	.....	.....	.....	.....	.....	.....
1-K	Walnut Grove Mutual Water Co. (c).....	781	.....	2 34	.....	1918	33.3	33.4	.....	33.3	.....	.....	.....	.....	.....	16.8	16.8	16.6	6 6	16 6	16 6	.....
		789	.....	1 01	.....	.....	.....	50.0	.....	50 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-K	Azusa Irrigation Co. (b) (c).....	5,508	.....	0 70	.....	1908	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		3,929	.....	2 00	.....	1918	.....	.....	.....	.....	3 0	3 0	4.4	6 6	8 8	11 0	13 0	13 0	13 0	11 0	8 8	4 4
1-K	Glendora Irrigation Co. (b) (c).....	1 152	.....	1 35	.....	1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1,000	.....	1 41	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-K	Glendora Mutual Water Co. (b) (c).....	1,000	.....	1 36	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-L	San Dimas Water Co. (c).....	2,200	.....	2 50	.....	1917	f100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			.....	1 67	.....	1918	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-L	La Verne Irrigation Co. (b) (c).....	200	.....	1 80	.....	1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		185	.....	2 16	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-L	Claremont Co-operative Water Co. (g).....	300	.....	2 16	.....	1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		400	.....	2 71	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1-L	La Verne Land and Water Co. (b) (i).....	4,000	.....	1 44	.....	1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		300	.....	1 67	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		300	.....	1 81	.....	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS—(a) From rpt. of B. A. Etcheverry, Berkeley, and T. H. Means, San Francisco. (b) From U. S. D. A. data collected by C. E. Tait. (c) Citrus belt, San Gabriel River. (d) Water used from 6 to 8 months; monthly amounts unknown. (e) From H. J. Gilman, Pres. of Co., San Dimas. (f) Citrus. (g) Coastal Plain of Santa Ana River. (h) Average 1918-1919. (i) Average 1918-1919.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section irrigated and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of di- verted water in con- vey- ance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
			Gross.	Net.			Al- falfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
					P. ct.	P. ct.																	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
1-M	Irrigation Co. of Pomona (a) (c).....	2,000 2,500	0.82 0.80	1918 1919	30.0	95.0 70.0	5.0	14.0	14.0	15.0	14.0	14.0	14.0

REMARKS—(a) Citrus belt; Santa Ana R. ver. (b) From O. E. S. Bull. 236, U. S. D. A. (c) From U. S. D. A. data collected by C. E. Tait. (d) From 4th Bien. Rpt., State Dept. of Eng. (e) Contains 50 per cent citrus and 50 per cent deciduous fruit. (f) 7 farms. (g) 8 farms. (h) 6 farms. (i) U. S. D. A. Irrigation Investigations. (j) Water used 7 months; monthly amounts unknown. (x) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.												
							Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
			Gross.	Net.																			
			Feet.	Pct.																			
1-M	San Antonio Water Co. (a) (c)	66,000 6,000 6,000 5,000 200		41.60 d1.60 d1.60 e1.20 2.28		1913 1914 1915 1918 e						7.0 1.5 f	2.0	3.3 4.8 4.4	9.7 9.5 5.8	11.8 10.5 6.0	11.5 12.2 13.1	11.3 12.3 13.1	11.1 12.4 13.1	11.4 12.3 13.1	6.6 11.5 13.1	2.8 1.7 3.9	
1-M	Monte Vista Irrigation Co. (c) (g)	950 950		0.82 0.82		1918 1919																	
1-N	Alta Loma Mutual Water Co. (c) (g)	120		1.68		1918																	
1-N	Imperial Water Co.	500		2.02		1918																	
1-N	Old Settlers' Water Co. (c) (g)	280		1.90		1918																	
1-N	Shiner Water Co. of Cucamonga (c) (g)	475		1.07		1918																	
1-N	Cucamonga Water Co. (c) (g)	3,000		0.85		1918																	
1-N	Edwards Water Co. (c) (g)	2,000		31.26		1918																	
1-N	Fontana Development Co. (g)	15,000 3,820	1.31	1.88		1912 e1918	5.4 100.0					7.0 1.2	8.0 x	13.0	x	8.0	13.0	11.0	9.0	7.0	6.0	6.0	6.0
1-N	Del Rosa Water Co. (c) (g)	585		1.40		1918																	
1-O	Marygold Mutual Water Co. (c) (g)	700		0.64	50.0	1918																	
1-O	Citizens Land and Water Co. (c) (g)	4,000	1.54 1.24	1.15 1.12		1917 1918																	
1-O	Terrace Water Co. (c) (g)	309		2.33		1918	3.0	97.0															

REMARKS—(a) Coastal Plant of Santa Ana River. (b) Exact average not kept by company. (c) From U. S. D. A. data collected by C. E. Tait. (d) Based on average season of 8 months; includes domestic use. (e) First right with ample water. (f) Water used 7 months; monthly amounts unknown. (g) Citrus belt, Santa Ana River. (h) About 5 1/2 months; monthly amounts unknown. (i) Water used during 109 days; monthly amounts unknown. (j) Averages for 10 years. (k) From 4th Bien. Rpt., State Dept. of Eng. (l) Eighty per cent of the water is used between April 1 and October 31. (m) Water used for 6 months; distribution unknown. (n) Water used; quantity unknown.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.												
			Gross.	Net.			Al-falfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1-Q	Continued from page 126. West Riverside Canal Co. (a)	67,000		1 60	d1920							5.0	1 6	5.4	12.9	14.3	14.2	14.8	13.5	8.5	4.7	5 1
1-Q		26,000			d1894							2.5	2.3	5.0	13.2	10.6	12.8	13.0	13.0	10.9	7.1	4.3	5.3
						d1895						0.1	0.1	0.9	3.0	10.1	15.4	16.0	16.2	12.7	8.8	3.7	7.0
						d1896						3.5	6.7	0.3	7.1	15.0	14.0	15.1	14.4	12.4	10.1	0.2	1.2
					d1897						1.7	.....	0.2	11.2	12.1	19.2	14.2	11.3	3.6	5.4	8.9	.....
					d1898						2.5	7.8	4.0	12.2	13.0	12.4	10.7	10.9	11.3	5.1	5.2	4.3	
					d1899						1.4	7.3	8.7	11.1	12.5	10.4	11.8	12.0	10.9	5.2	5.8	5.9	
					d1900						6.8	7 0	9.7	10.8	9.2	11.8	10.5	11.5	10.8	7.4	2.8	1 7	
					d1901						2.5	.....	9.0	13.8	12.4	11.9	11.4	11.0	10.4	9.0	2.0	6 6
					d1902						4 0	2.5	0.7	9.1	14.3	12.3	12.1	11.9	11.4	10.7	5.2	5.8	
					d1903						6.9	0.7	9.2	3 6	10.5	11.2	9.7	9.8	9.2	9.8	8.4	11 0	
					d1904						8.9	8 6	5.3	7.3	9 6	9 6	9 6	9 6	9 6	7.1	7.2	7 7	
		29,585	1 75	.....	d1905						2 6	.....	0.5	10.3	14.5	13.1	13.7	13.7	11.9	8.9	4.1	6 7
					d1906						4 9	1.1	1 2	9.1	14.3	13.4	13.1	12.5	10.3	10.5	8.9	0.7	
					d1907						0 6	0.1	0.2	8 8	14 8	14 3	15 0	12.5	13.2	6.0	4.8	9 7	
		29,050	2 42	.....	d1908						2.8	0.3	5.9	12.7	12.3	11.0	12.8	10.3	9.6	6.2	8.3	7 8
					d1909						3 4	.....	2.0	11.3	13.4	13.0	12.6	10.5	11.0	9.3	9.0	4 5
					d1910						0.1	4.8	9.7	8 0	12.1	11.1	11.4	8.8	9.2	8.6	8.2	8 0	
					d1911						4 4	.....	0.6	9.0	12.2	12.0	12.0	10.8	10.3	9.2	9.0	10 5
		29,000	2 90	.....	d1912						7 8	7 0	1.8	3 5	9.7	10.7	10.7	10.3	9.8	8.6	9.0	11 1
					d1913						8.3	0.8	5.3	12.5	12.2	10.7	11.3	9.6	10.2	9.8	5.6	4 4	
					d1914						0 6	.....	5.4	13.4	8 6	13.7	14.7	12.6	11.9	9.8	7 7	1 6
					d1915						0.5	.....	2.2	13.7	5 6	15.8	15.1	13.0	12.4	11.8	6.5	3 4
		7,580	3 35	2 01	d1908						2.8	0.5	5.9	12.5	12.2	11.0	12.8	9.9	9.6	6.7	8.3	7 8	
		7,660	63 36	2 92	d15 0	d1900					3 5	.....	2.0	11 3	13.4	13.0	12.8	9.9	11.0	9.5	9.0	4 6
		7,740	63 94	3 43	d15 0	d1910					4 2	4 8	0.7	8 0	12.2	10.9	11.3	8.3	9.2	8.5	9.1	8 0	
		7,820	63 54	3 08	d15 0	d1911					0.2	.....	0.6	9 3	12.2	11.9	11.9	10.8	10.2	9.2	9.2	10 5
		7,900	63 75	3 26	d15 0	d1912					7 8	6 8	1 8	3 5	9 7	10.7	10.7	10.3	9.9	8.7	9.0	11 1	
		7,978	63 41	2 96	d15 0	d1913					8 2	0 6	5 7	12 4	12 0	10 6	11 2	9 6	10 1	9 9	5 3	4 4	
		7,359	62 99	2 72	d1918						0 6	.....	4 8	13 5	8 7	13 8	14 7	12 7	11 9	9 9	7 8	1 6
		8,111			d1918						31 2	26 2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			2 95	.....	d1913						8 2	0 7	5 3	12 5	12 1	10 7	11 3	9 7	10 2	9 9	5 1	4 3

Continued on next page.

REMARKS—(a) Citrus belt, Santa Ana River. (b) Estimated by company. (c) From An. Rpts. of company to State R. R. Comm. (d) From U. S. D. A. data collected by C. E. Felt. (e) Gross use computed from net for an estimated loss of 15 per cent. (f) From transcript in appeal to the Supreme Court of the State of California. City of San Bernardino vs. City of Riverside and Riverside Water Co. (g) From rpt. by B. A. Echeverry, Berkeley, and T. H. Means, San Francisco, to City of San Francisco. (h) In average years irrigation in Jan. and Feb. is unnecessary. The delivered water as reported includes domestic use.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			Gross.				Alfalfa.	Trees. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			Feet.	Net.																			P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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REMARKS—(a) From rpt. by B. A. Elcheverry, Berkeley, and T. H. Means, San Francisco, to City of San Francisco. (b) Citrus belt, Santa Ana River. (c) From U. S. D. A. data collected by C. E. Taft. (d) First right with ample water. (e) Water used 6 months; monthly amounts unknown. (f) Irrigation only; domestic use deducted. (g) Water used for 250 days; monthly amounts unknown. (h) From 4th Biennial Rpt., State Dept. of Eng. (i) Coastal Plains, Santa Ana River. (j) Coastal Plains of Los Angeles County. (k) Water used 7 months; monthly amounts unknown. (l) These crops irrigated; area unknown. (m) In average years irrigation unnecessary in Jan. and Feb. The delivered water as reported includes domestic use.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

TABLE 8.

Section and key letter.	System	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.				Net.	Alfalfa.	Trees. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
			Feet.	P. ct.																				P. ct.
1-U	Capistrano Water Co. (a) (c)	400		83.24		1918	3.7	93.8		2.5														
1-U	Trabuco Water Co. (a) (c)	404		1.51		1918		84.3		15.7														
1-U	Oceanside Mutual Water Co. (d)	65		0.86		1916				100.0														
		10		1.10		1917				100.0														
		117		1.21		1918		8.5		91.5	4.7					7.3	17.8	11.5	7.5	11.0	17.5	10.7	7.6	4.4
		69		0.76		1919				100.0														
2-A	Yucaipa Water Co. No. 1 (f)	2,038		0.31		1915		100.0																
		2,051		0.53		1916		100.0																
		3,500	3.50			1916																		
		2,051		0.53		1918		100.0																
2-B	Beaumont Irrigation Dist. (g) (e)	2,120	40.44	0.32	27.9	1918		95.1		4.9							15.6	21.9	25.0	21.9	15.6			
		2,135	40.47	0.37	21.8	1919		95.1		4.9						2.2	16.9	23.2	19.2	18.9	14.7	4.9		
2-B	Cabazon Water Co. (b) (m)	7500		2.10		1919		100.0																
2-B	Banning Heights Mutual Water Co. (b) (g)	2,400		1.03		1918		100.0																
2-B	Banning Water Co. (b) (g)			1.94		1916																		
				1.96		1917																		
				2.58		1918																		
		2,850		1.90		1919		100.0								15.5	18.5	14.5	14.5	10.5	10.0	9.5	7.0	
2-C	Fruitvale Water Co., San Jacinto (k)	1,676		2.03		1913																		
		1,676		1.53		1914																		
		1,656		1.39		1915																		
		1,676		1.55		1916																		
		2,964		1.57		1917																		
		3,015		1.55		1918																		
		2,828		1.62		1919																		
		2,915		2.02		1920																		

REMARKS—(a) San Juan Creek. (b) From U. S. D. A. collected by C. E. Tail. (c) On basis of 180 days. (d) San Luis Rey River. (e) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (f) Citrus belt, Santa Ana River. (g) Deciduous belt. (h) This use is high because of abundant rainfall and small tract irrigation. (i) Water used 6 months; monthly amounts unknown. (j) Water used 7 months; monthly amounts unknown. (k) From company data by A. L. Sonderger, Los Angeles. (l) Crop mostly alfalfa. (m) Irrigation water from Millard Canyon. (n) From measurements by F. C. Finkle, Los Angeles. (z) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees and Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
2-C	Lake Hemet Water Co. (a)	Acres.	Feet.	Feet.	P. ct.			P. ct.		P. ct.		P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
		572	1.25			b1909		96.5		3.5														
		610	1.41			b1910		35.1		3.3														
		620	1.26			b1911		95.2		1.6	3.2													
		675	1.14			b1912		95.5		1.5	3.0													
		710	1.16			b1913		93.7		1.4	4.9													
		683	1.11			b1914		95.6		1.5	2.9													
		5,895	0.93			c1913				0.5	0.4	0.8	10.2	14.1	13.6	13.7	14.4	13.4	13.5	5.1	0.3			
		5,911	0.92			c1914					0.1	0.1	2.4	8.9	9.0	14.0	14.9	14.8	14.3	15.8	5.8			
		5,554	1.01			c1915					0.1	0.4	9.4	8.7	15.2	14.5	15.4	15.0	13.7	7.5	0.1			
2-D	Esccondido Mutual Water Co. (d)	Acres.	Feet.	Feet.	P. ct.																			
		5,600	0.96			c1916							0.1	6.2	16.1	15.7	14.9	16.5	15.5	4.2	10.6	0.2		
		6,000	0.98			c1917							0.9	6.0	14.5	17.2	15.4	16.1	12.8	9.7	3.0	4.4		
		6,000	1.01			c1918						1.2			0.1	3.2	18.2	18.3	17.8	16.9	13.2	5.9	5.0	0.2
		6,000	1.11			c1919						1.0	0.3	1.1	10.9	18.7	16.7	13.0	14.6	12.4	7.2	2.3	1.2	
		7,000	1.24			c1920						3.7	4.3	2.7	8.4	13.7	12.8	13.6	12.7	12.1	9.7	4.2	2.1	
						e1906						12.8	35.1	8.5								4.9	5.7	33.0
						e1907						4.9	4.3	11.2	20.6	17.5	16.6	2.2				2.8		19.9
						e1908						18.3	11.3	16.2	26.3	24.5							3.4	
						e1909						20.2	14.1	34.5	31.2									
2-E	Mission Valley (h) (i).	Acres.	Feet.	Feet.	P. ct.																			
		1,600	0.66			e1910						16.5	25.3	28.3	14.0	12.4	3.5							
		1,750	0.73			f1917		0100.0																
		2,000	0.66			f1918		0100.0																
		2,250	0.64			f1919		0100.0																
		2,500	0.74			f1920		0100.0																
2-E	Cuyamaca Water Co. (h)	Acres.	Feet.	Feet.	P. ct.																			
		1,114	4.08			1912		57.1	4.3	3.4														
2-E	Cuyamaca Water Co. (h)	Acres.	Feet.	Feet.	P. ct.																			
		3,725	0.96			f1909																		
		3,725	1.03			f1910																		
		3,725	0.81			f1911																		

Continued on next page.

REMARKS—(a) Deciduous belt. (b) From company. (c) From An. Rpts. of company to State R. R. Comm. (d) San Luis Rey River. (e) From data collected by W. S. Post, Los Angeles, from Volcan Water Co. (f) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (g) From J. B. Dixon, Esccondido. (h) San Diego River. (i) From rpt. by C. S. Alverson to State R. R. Comm. on ground waters of San Diego River. (j) Full supply not furnished to irrigators.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
2-E	Continued from page 130. Cuyamaca Water Co. (a).....	Acre.	3,725	d1913	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
			3,725	<0.48	.....	d1914	.....	.....	.....	.....	.....	7.8	8.2	10.3	18.3	16.7	11.7	12.0	6.4	6.1	1.4	0.7	0.4
			3,725	<0.64	.....	d1915	.....	.....	.....	.....	.....	0.7	0.6	8.7	13.3	12.2	11.5	12.9	15.7	10.3	6.7	4.6	2.2
			3,725	0.81	.....	d1916	b1.4	b1.4	b1.4	b1.4	b1.4	3.6	3.3	4.8	9.0	8.0	12.1	13.1	12.4	11.6	11.9	8.8	1.4
			3,725	0.96	.....	d1917	b1.4	b1.4	b1.4	b1.4	b1.4	2.4	1.5	3.3	7.6	11.9	11.7	13.9	12.1	10.7	7.9	9.3	7.7
			3,725	0.77	.....	d1918	.....	.....	.....	.....	.....	4.3	4.3	6.4	5.7	6.2	11.8	14.2	13.0	11.2	10.8	7.0	5.1
			3,725	0.73	.....	d1919	c81.8	.....	.....	.....	.....	4.2	1.3	0.6	4.1	14.1	14.8	15.5	15.6	13.5	9.7	4.9	1.7
2-E	La Mesa, Lemon Grove and Spring Valley Irrigation Dist. (a).....		3,725	0.75	.....	d1920	.....	.....	.....	.....	1.9	1.2	0.9	4.5	12.9	16.6	18.5	17.2	13.4	8.2	4.1	0.6	
			3,725	0.70	.....	d1921	.....	.....	.....	.....	.....	1.5	2.0	0.5	1.2	10.1	15.7	16.1	17.7	15.8	9.5	5.5	
			1,167	0.96	.....	c1616	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			722	5.20	.....	f1912	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2-E	Sweetwater Water Co. (g).....		2,924	1.05	.....	h1900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			2,904	1.38	.....	h1901	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			3,152	1.44	.....	h1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			3,810	1.21	.....	h1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			3,632	h1.10	.....	h1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			3,825	0.88	.....	h1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			3,954	0.95	.....	h1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			4,000	0.82	.....	h1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			4,060	1.00	.....	h1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			4,200	1.03	.....	h1918	c14.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2-E	City of San Diego (c).....		4,306	1.17	.....	h1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			4,306	1.15	.....	h1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,293	1.47	.....	c1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2-E	Average of eighteen mutual water companies (b) (i).....	33	.....	0.55	.....	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2-	Average of fifty-six mutual water companies (b) (i).....	29,464	.....	1.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2-	Average of fifty-six mutual water companies (b) (i).....	113,277	.....	1.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS—(a) From San Diego River, (b) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files, (c) From U. S. D. A. data collected by C. E. Tat. (d) From An. Rpts. of company to State R. R. Comm. (e) Full supply not furnished to irrigators. (f) From rpt. by C. S. Alverson to State R. R. Comm. on ground waters of San Diego River. (g) From Sweetwater River. (h) From J. F. Covert, engineer for company, San Diego. (i) Unclassified mutual water companies in Southern California.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in con- veyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.											
			Gross.				Al- falfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
			Feet.	Net.																		
3-A	Coacabella Valley farms (a)	1,139		4.95		1920	13.8	20.8	8.6	56.8	4.0	4.6	6.2	11.6	10.4	11.0	14.0	15.0	9.0	5.4	4.9	3.9
3-B	Imperial Water Co. No. 3 (i)	9,742	1.28	1.08	15.3	d1914	10.9			89.1												
		16,582	1.85	1.62	12.3	d1915	6.6			93.4												
		18,312	3.35	3.32	0.5	d1916	5.0			95.0	3.0	5.0	8.0	10.0	10.0	11.0	11.0	11.0	9.0	8.0	8.0	6.0
		35,000				c1917																
		44,000	3.00			b1918																
		50,416	d3.0			b1920																
3-B	Imperial Water Co. No. 9 (i)	e18,000	3.00			b1918																
		e22,000	d3.00			b1920																
3-C	Imperial Water Co. No. 4 (i)	15,000	1.62			f1905					6.0	1.0	4.0	18.0	9.0	7.0	15.0	8.0	6.0	5.0	6.0	15.0
		18,050				f1906					11.0	4.0	19.0	18.0	8.0	6.0	5.0	4.0	4.0	6.0	8.0	7.0
		18,050				c1908																
		18,050				c1909																
		18,050				c1910																
		18,050				c1911																
		18,000	3.21			f1912					5.0	6.0	10.0	10.0	9.0	11.0	10.0	10.0	9.0	8.0	7.0	5.0
		17,500	3.38			f1913					6.0	5.0	10.0	9.0	10.0	12.0	11.0	11.0	8.0	6.0	6.0	6.0
		18,050	a3.75			c1914																
		18,050				c1915																
		18,050	4.09			b1916					5.0	6.0	8.0	8.0	9.0	11.0	8.0	11.0	10.0	11.0	8.0	5.0
		18,100				c1917																
		19,000	3.02			b1919																
		20,000	2.63			b1920																
3-C	Imperial Water Co. No. 8 (i)	d14,680				c1908																
		d15,670				c1909																
		d17,460				c1910																
		d19,810				c1911																
		d24,000	3.29			f1912					5.0	6.0	9.0	10.0	8.0	9.0	11.0	13.0	10.0	8.0	6.0	5.0
		d24,000	3.74			f1913					5.0	6.0	10.0	10.0	10.0	10.0	12.0	10.0	7.0	5.0	5.0	5.0
		d18,000	4.63			b1914																
Continued on next page.																						

Continued on next page.

REMARKS—(a) Weighted mean for 19 farms; data by A. L. Sondergerger, Los Angeles. (b) From company rpt. to State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (c) From State Dept. of Pub. Wks., Div. of W. Rts. (d) Company estimate. (e) From census by company. (f) From 4th Bien. Rpt., State Dept. of Eng. (g) Acreage based on number of shares of water stock. (h) Tabulation of F. R. Spencer, State Dept. of Public Wks., Div. of Eng. and Irrig. files. (i) Gross duty based on water measured to mutual companies by Imperial Irrig. Dist. Measurements made at heads of company canals. Computations would show more water used if based on water diverted from Colorado River.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year	Area of crops in per cent of total.			Monthly use in per cent of annual use.																																
			Gross.	Net.			Alfalfa.	Trees. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																				
																							P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
																							Feet.	Feet.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
3-C	Continued from page 132. Imperial Water Co. No. 8 (g).	Acres. 226,950 227,324 c30,000 c38,000 c43,500	Feet. 4.04 2.89 2.62	Net. 3.51	13.2	a1915 b1916 a1917 b1918 b1920	45.0	55.0	5.0	5.0	8.0	9.0	10.0	13.0	11.0	12.0	10.0	7.0	6.0	4.0																						
3-D	Imperial Water Co. No. 12 (g).	1,650 2,770 5,270 11,000 12,000 12,300 12,500 11,505 12,000 12,100 15,000		Feet. 1.75 2.51 2.44 2.29 2.87 3.14 2.68 3.20 d3.00	13.5 14.6 9.3 10.6 14.7	a1909 a1910 a1911 b1912 a1913 b1914 b1915 b1916 a1917 b1918 b1920	22.2 23.6	77.8 76.4	2.0	5.0	6.0	10.0	11.0	14.0	12.0	15.0	12.0	7.0	4.0	2.0																						
3-D	Imperial Water Co. No. 2 (g).	f400 f430 f4,000 f4,200 f5,000 f6,000 f6,400 f7,000		3.70 4.95 3.05 3.00		a1912 a1913 b1914 a1915 b1916 a1917 b1918 b1920																																				
3-E	Imperial Water Co. No. 1 (g).	f70,000 f67,000 f78,000 f90,911 f99,572 f100,681		1.82 2.62 2.76 3.15		a1905 a1906 a1908 a1909 a1910 c1911 c1912	47.8 44.1 4.4	29.7 25.2 26.3	6.0	8.0	9.0	11.0	10.0	11.0	8.0	11.0	8.0	7.0	5.0	6.0	6.0	6.0	5.0																			
	Continued on next page.																																									

REMARKS—(a) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (b) From State Dept. of Pub. Wks., Div. of W. Rts. (c) From census by company. (d) Estimated. (e) From 4th Bion. Rpt., State Dept. of Eng. (f) From census by company. (g) Gross duty based on water measured to mutual companies by Imperial Irrig. Dist. Measurements made at heads of company canals. Computations would show more water used if based on water diverted from Colorado River.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth of land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.												
			Gross.	Net.			Alfalfa.	Trees and Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
3-E	Continued from page 153. Imperial Water Co. No. 1 (i)	7100,681	3.35	.....	.....	1913	59.0	0.9	32.0	8.1	.....	4.0	5.0	8.0	9.0	11.0	12.0	13.0	12.0	9.0	8.0	5.0	4.0
		7105,902	3.39	.....	.....	1914	54.1	0.9	16.5	28.5	.....	5.0	4.0	8.0	9.0	11.0	13.0	14.0	12.0	10.0	7.0	4.0	3.0
		7108,224	3.11	.....	.....	1915	47.9	1.7	18.8	31.6	.....	3.0	2.0	8.0	9.0	10.0	14.0	15.0	11.0	11.0	8.0	5.0	4.0
		7105,100	3.33	.....	.....	1916	42.5	2.0	11.8	43.7	.....	3.0	5.0	7.0	9.0	12.0	13.0	11.0	12.0	12.0	8.0	5.0	3.0
		7113,503	3.31	.....	.....	1917	31.5	2.2	9.0	57.3	.....	2.0	4.0	8.0	10.0	11.0	13.0	15.0	9.0	11.0	10.0	4.0	3.0
		7123,915	2.96	.....	.....	1918	30.3	1.9	9.7	58.1	.....	3.0	4.0	6.0	11.0	11.0	12.0	14.0	13.0	12.0	7.0	4.0	3.0
		7120,000	3.19	.....	.....	1919	.....	.....	.....	.....	.....	4.0	4.0	8.0	10.0	11.0	13.0	13.0	13.0	10.0	7.0	4.0	3.0
		7118,500	3.15	.....	.....	1920	.....	.....	.....	.....	.....	4.0	2.0	8.0	11.0	11.0	13.0	15.0	13.0	10.0	7.0	4.0	4.0
		7115,000	2.53	.....	.....	1921	.....	.....	.....	.....	.....	3.0	6.0	9.0	10.0	11.0	14.0	13.0	8.0	9.0	7.0	6.0	4.0
		25,000	.....	.....	.....	1904	.....	.....	.....	.....	.....	7.0	6.0	8.0	8.0	9.0	7.0	9.0	9.0	8.0	9.0	11.0	9.0
3-F	Imperial Irrigation Dist. (a) (j)	127,423	.....	.....	.....	1905	.....	.....	.....	.....	.....	7.0	3.0	5.0	19.0	9.0	8.0	10.0	10.0	8.0	8.0	5.0	8.0
		50,000	.....	.....	.....	1906	10.6	0.4	80.0	9.0	.....	9.0	5.0	14.0	13.0	9.0	10.0	8.0	8.0	7.0	6.0	6.0	5.0
		141,030	.....	.....	.....	1907	.....	.....	.....	.....	.....	4.0	7.0	10.0	13.0	9.0	8.0	10.0	9.0	9.0	6.0	8.0	7.0
		160,470	.....	.....	.....	1908	.....	.....	.....	.....	.....	6.0	5.0	11.0	11.0	10.0	10.0	11.0	10.0	8.0	8.0	6.0	4.0
		181,191	.....	.....	.....	1909	.....	.....	.....	.....	.....	5.0	8.0	10.0	12.0	9.0	10.0	12.0	7.0	7.0	7.0	6.0	6.0
		201,782	.....	.....	.....	1911	.....	.....	.....	.....	.....	5.0	6.0	11.0	12.0	11.0	10.0	8.0	9.0	8.0	6.0	6.0	6.0
		220,511	2.67	.....	.....	1912	44.0	.....	47.9	8.1	.....	4.0	4.0	9.0	10.0	10.0	10.0	11.0	12.0	10.0	8.0	6.0	5.0
		242,036	.....	.....	.....	1913	.....	.....	.....	.....	.....	4.0	5.0	9.0	10.0	10.0	11.0	12.0	12.0	9.0	8.0	5.0	5.0
		277,232	.....	.....	.....	1914	47.1	.....	26.6	26.3	.....	4.0	4.0	8.0	9.0	11.0	12.0	13.0	12.0	11.0	8.0	5.0	3.0
		293,534	.....	.....	.....	1915	.....	.....	.....	.....	.....	5.0	4.0	8.0	9.0	9.0	13.0	11.0	10.0	10.0	9.0	6.0	3.0
3-G	Imperial Water Co. No. 5 (j)	308,009	3.91	.....	.....	1916	42.1	.....	35.5	22.4	.....	3.0	5.0	7.0	11.0	11.0	12.0	13.0	12.0	7.0	4.0	3.0	4.0
		344,200	3.79	.....	.....	1917	.....	.....	.....	.....	.....	2.0	5.0	7.0	9.0	11.0	12.0	15.0	10.0	11.0	10.0	4.0	4.0
		367,020	3.94	.....	.....	1918	21.7	.....	31.5	46.8	.....	3.0	4.0	6.0	10.0	12.0	11.0	13.0	13.0	12.0	8.0	4.0	4.0
		413,440	3.46	.....	.....	1919	23.9	.....	31.8	44.3	.....	4.0	4.0	7.0	10.0	11.0	12.0	14.0	14.0	11.0	6.0	4.0	3.0
		414,724	3.26	.....	.....	1920	16.9	.....	30.6	62.5	.....	3.0	3.0	7.0	11.0	11.0	12.0	16.0	11.0	10.0	6.0	3.0	4.0
		410,010	3.08	.....	.....	1921	.....	.....	.....	.....	.....	5.0	7.0	9.0	10.0	11.0	12.0	13.0	10.0	8.0	6.0	5.0	4.0
		25,000	2.62	.....	.....	1905	.....	.....	.....	.....	.....	10.0	7.0	1.0	17.0	8.0	5.0	9.0	9.0	8.0	10.0	5.0	11.0
		21,000	.....	.....	.....	1906	.....	.....	.....	.....	.....	8.0	4.0	14.0	13.0	9.0	12.0	10.0	9.0	7.0	6.0	5.0	3.0
		24,000	.....	.....	.....	1908	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	.....	.....	1909	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS—(a) From 4th Bien. Rpt., State Dept. of Eng. (b) From State Dept. of Pub. Wks. Div. of Eng. and Irrig. files. (c) Computed from losses. (d) From company. (e) Estimated. (f) From census by company. (g) Includes all the Imperial Water Companies. (h) Min. acreage under contract; assumed. (i) From State Dept. of Pub. Wks., Div. of W. Rts. (j) Gross duty based on water measured t; mutual water companies by Imperial Irrig. Dist. Measurements made at heads of company canals. Computations would show more water used if based on water diverted from Colorado River.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section irrigation key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in con- vey- ance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
			Gross.	Net.			Al- fal- fa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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3-G	Continued from page 134. Imperial Water Co. No. 5 (f).	Acres.	Feet.	Feet.	P. ct.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

REMARKS—(a) State Dept. of Pub. Wks., Div. of W. Rts. (b) From 4th Bien. Rpt. State Dept. of Eng. (c) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (d) Estimated. (e) From census by company. (f) Gross duty based on water measured to mutual companies by Imperial Irrig. Dist. Measurements made at heads of company canals. Computations would show more water used if based on water diverted from Colorado River.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
3-H	Imperial East Side Water Co. (g).....	Acres.	Feet.	Feet.	P. ct.																			
		200	a1912																			
		1,000	a1913																			
		1,800	a1914																			
		2,200	a1915																			
3-H	South Alamo Water Co. (b).....	2,200	4.89	.....	b1916							4.0	7.0	10.0	11.0	10.0	9.0	11.0	11.0	11.0	7.0	3.0	5.0
		3,000	.....	.....	a1917																		
		785	.....	.....	1916																		
		900	.....	.....	1917																		
		c6,500	a1908																			
3-H	Imperial Water Co. No. 6 (g).....	c9,000	a1909																			
		c10,500	.....	.....	b1910																		
		c12,280	2.60	.....	a1911							5.0	6.0	11.0	12.0	7.0	9.0	11.0	10.0	9.0	8.0	7.0	5.0
		c15,000	2.95	.....	d1913							4.0	4.0	8.0	12.0	11.0	11.0	12.0	13.0	10.0	8.0	4.0	3.0
		c17,600	2.95	.....	a1914																		
		c15,500	3.89	.....	a1915																		
		c15,000	3.64	.....	b1916							1.0	3.0	4.0	12.0	11.0	15.0	11.0	16.0	15.0	7.0	3.0	2.0
		c18,000	.....	.....	a1917																		
		c19,500	.....	.....	a1918																		
		c20,540	3.00	a1920																			
3-f	Yuma Project, U. S. R. S. (e).....	c22,000	3.00	a1918																			
		7.00	4.85	30.7	1909																			
		4.20	3.10	26.2	1910																			
		7.15	5.43	24.1	1911																			
		13,767	7.00	4.59	1912																			
		19,607	6.50	4.36	1913																			
		25,207	8.14	3.69	1914																			
		27,857	8.88	3.34	1915																			
		29,483	8.46	3.20	1916																			
		36,956	9.14	3.70	1917																			
3-f	Yuma Project, U. S. R. S. (e).....	45,670	6.76	3.29	1918																			
		53,284	8.98	2.90	1919																			
		54,550	8.59	2.94	1920																			
		54,550	8.59	2.94	1920																			

REMARKS—(a) From State Dept. of Pub. Wks., Div. of W. Rts. (b) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (c) Acreage based on number of shares of water stock. (d) From 4th Bien Rpt., State Dept. of Eng. (e) From Reclamation Record, U. S. R. S. (f) Cotton. (g) Gross duty based on water measured to mutual companies by Imperial Irrig. Dist. Measurements made at heads of company canals. Computations would show more water used if based on water diverted from Colorado River.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.												
							Alfalfa.	Trees, vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
			Gross.	Net.																			P. ct.
3-J	Palo Verde Mutual Water Co.	32,000 33,376	4.90	4.00	a20.0	b	c1921	16.0		16.0	68.0	1.0	3.0	10.0	13.0	10.0	15.0	19.0	19.0	8.0	0.5	1.0	0.5
4-A	Palmdale Water Co.	6400 525		0.75 0.75		d1916 e1918		100.0 23.8	100.0 76.2														
4-B	Little Rock Irrigation Dist.	1,500		0.85		d1916		100.0	100.0														
				1.50		e																	
				1.00		f		100.0	100.0														
4-C	Appleton Land, Water and Power Co. (b)	200		0.80			1918	70.0	30.0														
4-D	Mohave River Irrigation Dist. (d)	1,330		0.82			1916	100.0	100.0														
4-D	Victor Valley Irrigation Dist. (i)	1,754		2.86			1912	37.0	63.0														
4-D	Victor Valley, San Bernardino County	j196 796		12.40 0.98			1917 1917	100.0 100.0															
5-A	Newlands Project, U. S. R. S., State of Nevada (a) (b). (Formerly Truckee-Carson Project)	29,325 27,557 30,139 30,690 30,857 28,651 40,295 39,400 40,392	6.8 6.5 8.7 9.74 6.04 5.81 3.32 6.56	5.00 4.70 4.50 2.50 2.26 2.94 3.32 3.11	26.0 28.0 48.0 62.5 65.5 49.4 50.5 52.6	k1909 l1910 m1911 n1912 o1913 p1914 q1915 r1916 s1917		37.6 37.6 43.4	0.3 0.3	18.7													

Continued on next page.

Continued on next page.

REMARKS—(a) Estimated by company. (b) From U. S. D. A. data collected by C. E. Toit. (c) From company. (d) From rpt. of findings, Mohave River Comm. (e) From Eng. News-Record, Jan. 24, 1918. (f) Measurements by Alvin Bros., Pasadena. (g) Irrigating season 152 days. (h) Season from Mar. 1 to June 30. (i) From 6th Bien. Rpt. State Dept. of Eng. (j) For weighted average of tracts on which measurements were made. Mohave River Comm. states that as two tracts were in river bottom where water was plentiful and application cheap, too much water was used. It recommends a depth of 5.72 feet or less. (k) From An. Rpt. of U. S. R. S. (l) From Reclamation Record, U. S. R. S., Vols. I to II. (m) Crop census compiled from detailed tabulations found in Reclamation Record. (n) Water used during these months; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			Annual use in depth on land.				Alfalfa.	Trees. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			Gross.	Net.																			P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
5-A	Continued from page 157. Newlands Project, U. S. R. S., State of Nevada (a) (b); (Formerly Truckee-Carson Project).....	42,311 44,324 45,610	6.31 7.16 5.68	2.99 3.02 2.83	52.6 57.8 49.7	1918 1919 1920	60.0 63.0 68.0			36.0 32.0 28.0	4.0 5.0 4.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

REMARKS—(a) From Reclamation Record of U. S. R. S., Vols. 1 to 11. (b) Crop censuses compiled from detailed tabulations found in Reclamation Record. (c) Meadow hay, two crops per year. (d) Measurements by U. S. G. S. (e) From 4th Bim. Rpt., State Dept. of Eng. (f) Mostly grass. (g) From case of Hillside Water Co. vs. Wm. A. Trickery before A. E. Chandler, Arbitrator, July, 1921. Use estimated by defendant's engineers. (h) Measurements by C. H. Lee, San Francisco. (z) These crops irrigated; area unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			Acres.	Feet.			Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.

REMARKS—(a) Water diverted from Stanislaus River to irrigate south of Oakdale. (b) From W. S. Papers, U. S. G. S. Nos. 411, 441, 461 and 481, and records of Oakdale Irrigation Dist. (c) Deducted from diversions as given in W. S. Papers, U. S. G. S. and district records. (d) Rice, 0.7 per cent of total crops. (e) Rice, 4.1 per cent of total crops. (f) Rice, 8.2 per cent of total crops. (g) Rice, 11.6 per cent of total crops. (h) Rice, 2.1 per cent of total crops. (i) From 1921 district crop report. (j) Water diverted from Kaweah River. (k) From An. Rpts. of company to State R. R. Comm. (l) As only one acreage was given for years 1914 to 1920, inclusive, duty given is average for these years. (m) Data from Water Resources of Tulare County and their Utilization, by S. T. Harding, 1922. Rpt. of State Dept. of Pub. Wks., Div. of Eng. and Irrig. (n) Water pumped from wells to irrigate vicinity Lindsay and Strathmore. (o) From company records. (p) Estimated by company. (q) From 4th Bien. Rpt., State Dept. of Eng. (r) These crops irrigated; area unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Less of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.											
			Gross.	Net.			Alfalfa.	Trees and Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Feet.	Feet.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	
6-F	Terra Bella Irrigation Dist. (a) (b).....	3,000 2,212 1,934 2,901 1,51	41.75 1.30 1.63 1.34 1.51	..... 1.50 1.63 1.34 1.51	..... 1917 1918 1919 1920 1921	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................
7-B	East Contra Costa Irrigation Co. (d) (e).....	3,733 4,206 3,247 5,304	3.52 2.32 1.96 2.88	2.65 2.25 1.60 2.57	24.8 3.1 1918 18.2 11.0 1920 1921 1922	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................
7-C	West Side Irrigation Dist. (f) (g).....	11,000 11,200 11,750	1.93 1.96 1.82	41.54 41.57 41.46	20.0 20.0 20.0 1919 1920 1921 1922	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................	.........................
7-C	Naglee-Burke Irrigation Dist. (i) (j).....	3,000.....	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........
7-C	Riverview Farm and Water Co. (k) (l).....	2,400.....	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........
7-C	Byroc-Bethany Irrigation Dist. (q).....	1,750.....	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........	..........
7-E	South San Joaquin Irrigation Dist. (m) (n).....	15,600 23,211 33,524 37,987 51,700 51,373 59,302 53,074	4.35 4.05 4.05 4.05 2.62 2.36 2.16 4.20	63.05 62.84 62.84 62.84 61.83 62.00 62.20 62.31	30.0 30.0 30.0 30.0 30.0 30.0 30.0 45.0	1914 1915 1916 1917 1918 1919 1920 1921 1922	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................	..............................

REMARKS.—(a) Water pumped from wells to irrigate in the vicinity of Terra Bella. (b) From rpt. by I. H. Althouse, Ventura, and records of Terra Bella Irrigation Dist. (c) Estimated by company near Bethany. (d) Water pumped from San Joaquin River, Indian Slough, to irrigate in vicinity of Brentwood. (e) From 1920 rpt. by A. Kempke, Chief Eng. (f) Water pumped from San Joaquin River to irrigate near Bethany. (g) From rpt. by W. D. Harrington, Chief Eng., and notes of R. E. Robson and T. H. Means, San Francisco. (h) From 20 per cent loss assumed by R. E. Robson. (i) Water pumped from San Joaquin River to irrigate near Tracy. (j) From Naglee-Burke Irrigation Dist. (k) Water diverted from San Joaquin River to irrigate near Tracy. (l) From Riverview Farm and Water Co. (m) Water diverted from Stanislaus River to irrigate near Naglee. (n) Water first run in 1913. (o) From W. S. Papers, U. S. G. S. Nos. 391, 411, 441, 461 and 481. Records of South San Joaquin Irrigation Dist.; private report by R. E. Robson for T. H. Means, San Francisco. (p) Net use computed from a loss estimated at 30 per cent by R. E. Robson. (q) Net use computed from a loss estimated at 45 per cent by Burton Smith. (r) Data from Duty of Water West Side of San Joaquin Valley, California, by R. E. Robson, San Francisco. (s) These crops irrigated; area not known.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irri- gated.	Annual use in depth on land.		Loss of di- verted water in con- vey- ance.	Year.	Area of crops in per cent of total.					Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			Gross.	Net.			Al- falfa.	Trces. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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7-F	Modesto Irrigation Dist. (a) (b).....	Acres.	Feet.	Feet.	P. ct.	1904	x	x	x	x	12.0	5.0	9.0	10.0	13.0	16.0	16.0	14.0	5.0

Continued on next page.

REMARKS.—(a) Water diverted from the Tuolumne River to irrigate near Modesto. Water first run in 1903. (b) From 4th Bion. Rpt., State Dept. of Eng., Water Supply Papers, U. S. G. S., Nos. 299, 331, 361, 391, 411, 441, 461 and 481; records of Modesto Irrigation Dist.; reports by B. A. Etcheverry, Berkeley, J. D. Galloway and T. H. Means, San Francisco. (c) Water supply short. (d) From measurements and estimates on number of canals in district by K. A. Heron, Berkeley. (e) From measurements by T. H. Means, San Francisco, and B. A. Etcheverry, Berkeley, on parts of the system. (f) Rice, 0.1 per cent of total crops. (g) Rice, 1.3 per cent of total crops. (h) Rice, 2.6 per cent of total crops. (i) Rice, 2.6 per cent of total crops. (j) From rpt. to P. V. Long, City Attorney of San Francisco, by B. A. Etcheverry, Berkeley, and T. H. Means, San Francisco. (k) These crops irrigated; areas unknown. (l) Includes loss from foothill reservoir.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees.	Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
7-F	Continued from page 141. Modesto Irrigation Dist. (a).....	52,381	4.10	.....	.....	1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		51,915	3.07	2.63	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		53,759	3.87	2.65	.....	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		54,066	5.03	3.02	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		57,861	4.20	2.48	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-G	Patterson Water Co. (b) (c).....	55,475	3.94	2.36	.....	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		4,000	7.46	5.48	26.5	1913	87.5	12.5	.....	.....	.....	.....	1.0	5.5	11.9	10.4	13.5	12.2	13.8	13.8	11.8	5.7	0.4	
		6,000	4.30	2.90	32.5	1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		7,250	3.49	2.76	20.9	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		8,500	3.64	2.95	18.9	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-G	Patterson pump (d).....	9,600	3.65	2.63	28.0	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		10,700	3.17	2.12	33.1	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		13,300	2.68	1.89	29.4	1919	81.2	5.9	12.2	0.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		15,250	2.42	1.77	26.8	1920	83.5	8.2	3.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		6,200	2.00	.....	.....	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-H	Turlock Irrigation Dist. (e) (f).....	3,757	12.78	.....	.....	1901	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		7,000	16.00	.....	.....	1902	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		8,763	15.62	.....	.....	1903	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		19,100	8.34	.....	.....	1904	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		21,000	6.25	.....	.....	1905	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-H	Continued on next page. Turlock Irrigation Dist. (e) (f).....	32,578	6.30	.....	.....	1906	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		47,803	4.05	.....	.....	1907	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		49,871	4.11	.....	.....	1908	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		51,940	4.59	.....	.....	1909	56.7	21.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		64,798	2.17	.....	.....	1910	64.6	16.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-H	Continued on next page. Turlock Irrigation Dist. (e) (f).....	71,106	4.25	.....	.....	1911	70.0	14.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		79,916	3.13	.....	.....	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Continued on next page.

REMARKS—(a) From rpt. to P. V. Long, City Attorney of San Francisco, by B. A. Etcheverry, Berkeley, and T. H. Means, San Francisco. (b) Water pumped from San Joaquin River to irrigate in vicinity of Patterson. (c) From private report by R. E. Robson to T. H. Means, San Francisco. (d) From 4th Bien. Rpt., State Dept. of Eng. (e) Water diverted from Tuolumne River to irrigate area southeast of Modesto. (f) From 4th Bien. Rpt., State Dept. of Eng.; W. S. Papers, U. S. G. S., Nos. 299, 331, 391, 411, 441, 461 and 481; records of Turlock Irrigation Dist.; reports by J. D. Galloway and T. H. Means, San Francisco; B. A. Etcheverry, Berkeley; Burton Smith, Stockton; and A. J. Wiley, Boise, Idaho. (g) Water supply short. (h) These crops irrigated; areas unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
			Gross.	Net.			Alfalfa.	Trees.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
7-H	Turlock Irrigation Dist. (a).	85,062	3.57			b1913		73.2	8.5	8.3	10.0		4.6	10.2	20.2	23.1	22.1	13.3	6.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</

REMARKS—(a) Water diverted from Tuolumne River to irrigate area around Turlock. Water first run in 1901. (b) From 4th Ben. Rpt., State Dept. of Eng.; W. S. Papers, U. S. G. S., Nos. 290, 321, 351, 391, 411, 441, 461 and 481; records of Turlock Irrigation Dist.; rpts. by B. A. Etcheverry, Berkeley; T. H. Means and J. D. Galloway, San Francisco; Burton Smith, Stockton; and A. J. Wiley, Boise, Idaho. (c) Net use obtained from summation of irrigators' records. R. V. Meek, Chief Eng., Turlock Irrigation Dist., believes more water was used from 1915 to 1921 than shown; probably close to 2 ft. (d) Net use. (e) From rpt. to P. V. Long, City Attorney of San Francisco, by B. A. Etcheverry, Berkeley, and T. H. Means, San Francisco. (f) Includes loss from foothill storage reservoir and waste back to river.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees and Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
7-I	American Seedless Raisin Co. (a) (b)....	800 1,100 1,100	Fect.	0.83 1.45 1.05	c c c	1917 1918 1919	..... ..... .....	..... ..... .....	100.0 100.0 100.0	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	1.5 2.4 3.1	11.6 18.4 15.1	27.6 27.6 21.7	33.1 21.4 18.3	20.9 25.0 25.2	5.3 10.2 16.6	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....
7-I	Crocker-Huffman Land and Water Co. (d) (e).....	28,000	12.45	1912 1919 25.2 20.3 718.4
7-L	San Joaquin and Kings River Canal Co. (g).....	145,405 170,957	1.64 1.93	..... .....	..... .....	h1907 h1908	..... .....	..... .....	40.4 35.8	8.0 11.0	51.6 53.2	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
		88,177 163,350	1.57	.....	.....	h1911 h1912	..... .....	..... .....	78.1	21.9 .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
		61,737 119,523	42.12	.....	.....	h1913 h1914	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
		117,253 104,815	42.12	.....	.....	h1915 h1916	..... .....	..... .....	180.0 .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
		104,900 81,479	.....	.....	.....	h1917 h1918	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
		106,258 108,979	.....	.....	.....	h1919 h1920	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
7-L	Miller and Lux Canal.....	55,700	2.46	.....	.....	.....	.....	.....	23.3	6.7	70.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-L	Farms in the vicinity of Mendota (h) (j).....	43,323 43,588 m4,126 n4,934	..... ..... ..... .....	1.99 2.01 1.91 2.28	c c c c	1917 1918 1919 1920	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....
7-L	Brown Slough (o).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-L	Aliso Canal (p).....	55,700	4.45	.....	.....	q1912	.....	.....	23.4	6.6	70.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS—(a) Water pumped from wells on property to irrigate near Livingston. (b) From private rpt. by R. E. Robson, to T. H. Means, San Francisco. (c) Losses negligible. (d) Water diverted from Merced River to irrigate in vicinity of Merced. (e) From 4th Bien. Rpt., State Dept. of Eng. and rpt. by J. D. Galloway, San Francisco. (f) Rice, 1.4 per cent of total crop. (g) Water diverted from San Joaquin River to irrigate northwest of Mendota. (h) From 4th Bien. Rpt., State Dept. of Eng. and An. Rpt. of company to State R. R. Comm. (i) From B. A. Etcheverry, Berkeley. (j) Water pumped from wells on property. (k) Tabulated average for 4 farms. (l) Tabulated average for 6 farms. (m) Tabulated average for 8 farms. (n) Tabulated average for 9 farms. (o) Irrigates area northeast of Mendota. (p) Water diverted from San Joaquin River to irrigate northeast of Mendota. (q) From 4th Bien. Rpt., State Dept. of Eng.

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TABLE 8.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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7-L	Chowchilla Canal (a).....	Acrea.										5.0	3.0	5.0	10.0	22.0	29.0	15.0	7.0	4.0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													</

Continued on next page.

REMARKS.—(a) Water diverted from sloughs to irrigate northeast of Mendota. (b) Water diverted from Fresno River to irrigate in vicinity of Madera. (c) From 4th Hien. Rpt., State Dept. of Eng. (e) From An. Rpts. of company to State R. R. Comm. (f) Pasture land. (g) Water diverted from San Joaquin River to irrigate southwest of Merced. (h) From State Dept. of Pub. Wks., Div. of W. Res. (i) Water diverted from Fresno Canal. (j) From rpt by W. L. Huber, San Francisco. (k) Stream flow deficient. (l) Water diverted from Kings River. (m) Estimated. (n) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files, and rpts. by W. L. Huber and I. Teilmann included in rpt. of T. H. Means, San Francisco.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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REMARKS—(a) Water diverted from Kings River. (b) Estimated. (c) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. and files; Rpts. by W. L. Huber and I. Tellman included in Rpt. of T. H. Means, San Francisco. (d) From Rpt. by W. L. Huber, San Francisco. (e) Both divert water from Kings River. (f) From Rpts. by W. L. Huber, San Francisco, and Rpt. on Storage of Water on Kings River, 1920, by J. B. Lippincott, M. W. Enderlein and W. S. Post, Los Angeles. (g) Diversion limited by supply in river. (h) From Dept. Pub. Wks., Div. of Eng. and Irrig. files and Rpt. on Storage of Water on Kings River, 1920, as note f.

Continued on next page.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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REMARKS:—(a) Water diverted from Kings River. (b) From Rpt. on Storage of Water on Kings River, 1920, by J. B. Lippincott, M. W. Enfield and W. S. Post. Los Angeles. (c) Use of water from Kings River, by Harry Barnes, 1918. (d) Mean for 7 years. (e) From applications by Goodfellow and Nares; Purdie and Mitchell in State Dept. of Pub. Wks., Div. of W. Rts. file; and rpt. by Board of Engineers, Kings River Conservancy District. (f) From State Dept. of Pub. Wks., Div. of W. Rts. (g) From Rpt. by Goodfellow and Nares. (h) Estimated. (i) Water used; areas unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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7-S	Stinson Canal (a).....	Acres.	614,500	0.71	1918	9.2	3.3	3.4	49.8	45.7	1.1

Continued on next page.

REMARKS—(a) From State Dept. of Pub. Wks., Div. of W. Rts. (b) Estimated. (c) Water diverted from Kings River. (d) From Rpt. of Storage on Kings River, 1920, by J. B. Lippincott. M. W. Enderlein and W. S. Post, Los Angeles. (e) From State Water Commission. (f) Mean for 2 years. (g) From applications of Goodfellow and Nares; Purchase and Mitchell in State Dept. of Pub. Wks., Div. of W. Rts. (h) Use of Water from Kings River by Harry Barnes, 1918. (i) Av. present use of District. (j) From Rpt. by S. C. Whipple to State Eng., Rpt. of Storage on Kings River, 1920, by J. B. Lippincott. M. W. Enderlein and W. S. Post, Los Angeles, and rpt. of T. H. Means, San Francisco. (z) These crops irrigated; areas unknown. (y) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Acres.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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REMARKS—(a) Water diverted from Kings River. (b) From rpt. by S. C. Whipple to State Eng., rpt. of T. H. Means, San Francisco, and rpt. on Storage of Water on Kings River, 1920, by J. B. Lippincott, M. W. Enderlein and W. S. Post, Los Angeles. (c) From Water Resources of Tulare County and their Utilization, by S. T. Harding, 1922, State Dept. of Pub. Wks., Div. of Eng. and Irrig.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.	Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
						Alfalfa.	Trees.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Gross.	Net.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.					
7-T	Tulare Irrigation Dist. (a)	12,199	5.1	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.5	41.4	35.4	3.7	.....	.....	.....	.....	.....
		12,199	2.8	.....	1920	.....	64.8	4.9	23.2	7.1	.....	.....	.....	.....	3.6	12.3	49.1	35.0	.....	.....	.....	.....	.....
		12,199	2.8	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.7	5.2	46.6	45.8	0.7	.....	.....	.....	.....
7-T	Packwood Ditch (a)	3,000	5.5	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.6	41.8	52.0	0.6	.....	.....	.....	.....
		3,000	2.2	.....	1920	.....	48.9	17.9	30.6	2.6	.....	.....	.....	.....	11.6	50.0	38.4	.....	.....	.....	.....	.....
		3,000	2.3	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41.5	58.5	.....	.....	.....	.....	.....
7-T	Lakeside Ditch (a)	19,750	1.9	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24.4	32.7	34.0	8.9	.....	.....	.....	.....
		19,750	2.3	.....	1920	.....	55.7	1.7	32.2	10.4	.....	.....	.....	.....	3.2	21.2	43.4	31.2	1.0	.....	.....	.....	.....
		19,750	2.8	.....	1921	.....	.....	.....	.....	.....	0.4	2.7	16.1	12.9	35.4	30.3	2.2	.....	.....	.....	.....	.....	.....
7-T	Goshon's Ditch (a)	1,867	1.3	.....	1920	.....	38.6	.....	29.2	32.2	.....	.....	.....	.....	.....	28.0	44.0	28.0	.....	.....	.....	.....	.....
		1,867	1.6	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.0	50.0	.....	.....	.....	.....	.....	.....
7-T	Sweezy Ditch (a)	.....	.....	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26.7	27.8	27.8	17.7	.....	.....	.....	.....
7-T	Hamilton Ditch (a)	.....	.....	.....	1921	.....	.....	.....	.....	.....	13.0	11.1	13.0	13.4	13.9	13.9	13.5	8.2	.....	.....	.....	.....	.....
7-T	Wutchumna-Barton Cnt (a)	.....	.....	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.0	38.0	38.0	5.0	.....	.....	.....	.....
7-T	Wutchumna Ditch (a)	7,446	.....	.....	1920	.....	11.8	75.3	10.9	2.0	.....	.....	.....	.....	14.0	19.8	23.2	27.4	11.7	3.9	.....	.....	.....
		7,446	.....	.....	1921	.....	.....	.....	.....	.....	0.2	3.3	9.8	22.3	24.2	20.3	9.2	1.6	0.3	7.6	1.2	.....	.....
7-T	Area irrigated by Kaweah River (a)	175,000	2.3	.....	1921	.....	28.5	34.4	14.8	22.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-T	Jeonings's Ditch (a)	630	4.1	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26.9	26.9	26.9	19.3	.....	.....	.....	.....
		630	7.4	.....	1920	.....	47.7	15.8	36.5	.....	.....	.....	.....	.....	4.1	22.6	29.9	29.9	13.5	.....	.....	.....	.....
		630	7.8	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.2	15.1	19.7	25.5	28.4	10.1	.....	.....	.....
7-T	Mathews Ditch (a)	928	5.1	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21.3	25.6	23.4	24.5	5.2	.....	.....	.....
		928	6.3	.....	1920	.....	74.5	1.5	20.7	3.3	.....	.....	.....	.....	17.3	20.6	24.9	22.6	14.6	.....	.....	.....	.....
		928	6.1	.....	1921	.....	.....	.....	.....	.....	5.9	9.0	13.8	17.2	20.8	19.9	11.9	.....	.....	.....	.....	.....	1.5
7-T	Modoc Ditch (a)	3,590	2.7	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28.3	26.7	25.1	19.9	.....	.....	.....	.....

Continued on next page.

REMARKS—(a) From Water Resources of Tulare County and their Utilization, by S. T. Harding, 1922, State Dept. of Pub. Wks., Div. of Eng. and Irrig.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

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REMARKS—(a) From Water Resources of Tulare County and their Utilization, by S. T. Harding, 1922, State Dept. of Pub. Wks., Div. of Eng. and Irrig. (b) This acreage includes (c) (d) and (e). (f) From 4th Bico. Rept., State Dept. of Eng. (g) From 14th U. S. Census, 1920. (x) Water used; quantities unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in con- vey- ance.	Year.	Area of crops in per cent of total.			Monthly use in per cent of annual use.												
			Gross.				Al- fal- fa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
			Feet.	Net.	P. ct.																	
7-X	Callaway Canal (a) (b)	Acres.	50,000	4.20	.....	1906	x	.....	.....	.....	1.0	.....	6.0	22.0	23.0	17.0	16.0	7.0	4.0	3.0	1.0	.....
			51,224		.....	1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			44,200	3.60	2.94	1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			24,000	3.81	3.06	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			8,700	4.18	2.65	1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			56,000	3.61	3.00	1914	.....	.....	.....	.....	0.4	2.3	18.1	18.9	22.4	20.8	16.9	5.1	0.4	0.7	.....	.....
			38,600	3.63	3.08	1915	.....	.....	.....	.....	.....	.....	0.9	20.2	26.0	31.8	20.4	0.7	.....	.....	.....	.....
			52,400	3.56	3.02	1916	.....	.....	.....	.....	.....	1.8	5.1	21.6	25.5	21.2	10.6	5.2	3.9	2.5	1.9	0.7
			46,000	3.61	3.18	1917	.....	.....	.....	.....	.....	2.2	10.1	25.2	22.4	20.8	12.2	6.6	0.2	0.2	.....	0.1
			24,400	3.79	2.93	1918	.....	.....	.....	.....	.....	.....	.....	16.6	26.4	13.9	37.5	3.4	.....	.....	.....	.....
			18,600	3.91	3.03	1919	.....	.....	.....	.....	81.0	3.1	14.5	1.4	.....	.....	.....	.....	.....	.....	.....	.....
			24,800	3.79	2.70	1920	.....	.....	.....	.....	45.0	4.6	14.1	36.3	.....	.....	.....	.....	.....	.....	.....	.....
7-X	Lerdo Canal (b) (d)	.....	5,000	2.75	.....	1906	x	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			5,300	3.56	2.35	1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			5,100	3.62	2.22	1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			2,000	5.10	3.22	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,000	6.00	4.14	1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			4,300	3.78	3.36	1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			2,450	4.75	4.25	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			5,900	3.38	2.14	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			6,900	3.18	2.62	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,750	5.22	3.67	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			3,050	4.41	3.31	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,500	5.35	3.54	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-Y	Anderson Canal (b) (e)	.....	2,000	9.11	.....	1906	x	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
			1,950	.....	.....	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Continued on next page.																						

Continued on next page.

REMARKS—(a) Water diverted from Kern River. In priority 13th, above "Second Point." (b) From 4th Bien. Rpt., State Dept. of Eng. and original notes for Bull. 9, State Dept., of Eng. by S. T. Harding, 1921. (c) Estimated. (d) Water diverted from Kern River through Boardley Canal. (e) Water diverted from Kern River. In priority 4th, above "Second Point." (z) These crops irrigated; quantities unknown.

TABLE 8.

[illegible]

REMARKS—(a) Water diverted from Kern River, in priority 4th, above "Second Point." (b) From 1st Bicn. Rpt., State Dept. of Eng., and original notes for Bull. 9, State Dept. of Eng., by S. T. Harding, 1921. (c) Water diverted from Kern River, in priority 4th, above "Second Point." (d) Water diverted from Kings River, priority undeline. (e) Estimated. (f) Water diverted from Kern River, in priority 10th and 14th, above "Second Point." (g) Figures excessive. (x) These crops irrigated; area unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
																							P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
7-Y	East Side Canal (a) (b)	Acres.	Feet.	Feet.	P. ct.	1896						0.1	1.0	12.4	23.2	17.0	17.0	17.6	9.9	1.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											</

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REMARKS—(a) Water diverted from Kern River. (b) From original notes for Bull. 9, State Dept. of Eng., by S. T. Harding, 1921. (c) Estimated. (d) Water diverted from Kern River, in priority 151b, above "Second Point." Diversion supplemented by pumping, which increases the percentage of use in June to September, inclusive, and reduces it in other months. (x) These crops irrigated; quantities unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
			Gross.	Net.			Alfalfa.	Trees and vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
7-Y	Continued from page 154. Kern Island Canal (a) (b).....	Acrea.	P. ct.

REMARKS—(a) Water diverted from Kern River, in priority 15th, above "Second Point." Diversion supplemented by pumping, which increases the percentages of use in June, July, August and September and reduces it in other months. (b) From original notes for Bull. 9, State Dept. of Eng., by S. T. Harding, 1921. (c) From 14th U. S. Census, 1920. (d) Water diverted from Kern River, in priority 3rd, above "Second Point." (e) From 4th Bien. Rep., State Dept. of Eng. (f) Estimated. (g) Figures excessive. (h) From State Dept. of Pub. Wks., Div. of W. Rts., and San Joaquin Valley Farms Co. (i) From State Dept. of Pub. Wks., Div. of W. Rts. (r) These crops irrigated; quantities unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
																							P.ct.	P.ct.
7-Z	Pioneer Canal (a) (b).....	Acres.	Feet.	Feet.	P.ct.	1906	z	z	z	z	z	9 0	5 0	5 0	13 0	13 0	19 0	9 0	7 0	5 0	8 0	4 0	3 0	
		c12,000	5.00	.....	.....	1910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		8,268	.....	.....	.....	1911	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		10,482	.....	.....	.....	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		5,232	.....	.....	.....	1913	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		8,481	.....	.....	.....	1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		18,621	2.86	.....	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		9,094	2.54	.....	.....	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		11,732	3.26	.....	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		9,158	2.28	.....	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7-Z	Buena Vista Canal (b) (d) (e).....	Acres.	Feet.	Feet.	P.ct.	1919	31 5	0 5	3 2	64 8	30 8	21 6	8 9	.....	.....	.....	.....	.....	.....	.....	.....	.....
		12,620	2.32	1.65	29 5	1920	49 5	.....	7 5	43 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		8,103	3.30	2.02	38 7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		c8,000	2.00	1906	z	z	z	z	z	z	9 0	6 0	8 0	10 0	12 0	15 0	13 0	8 0	8 0	6 0	4 0	1 0
		f6,500	1910
		f7,280	1911
		f7,320	1912
		f7,920	1913
		7,460	3.55	1.99	44 2	1914
		6,760	2.28	1.90	16 9	1915
7-Z	Stine Canal (b) (g).....	Acres.	Feet.	Feet.	P.ct.	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		7,420	2.32	1.85	20 5	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		6,780	2.54	1.77	30 4	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		6,920	3.00	1.81	40 0	1919	40 0	.....	45 0	15 0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		8,220	1.76	1.39	20 8	1920	35 7	0 4	54 6	9 3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		7,806	2.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		c10,000	2.32	1906	z	z	z	z	z	z	15 0	10 0	2 0	8 0	20 0	13 0	7 0	9 0	8 0	6 0	1 0	1 0
		f9,268	1910
		f9,630	1911
		f10,547	1912
		f11,561	1913
		9,620	4.50	2.80	37 7	1914
		9,210	3.30	1.90	43 8	1915

Continued on next page.

Continued on next page.

REMARKS—(a) Water diverted from Kern River, in priority 9th, above "Second Point." (b) From 4th Ben. Rpt., State Dept. of Eng. and original notes for Bull. 9, State Dept. of Eng., by S. T. Harding, 1921. (c) Estimated. (d) Water diverted from Kern River, in priority 2d, above "Second Point." (e) From An. Rpts. of company to State R. R. Comm. (f) Figures excessive. (g) Water diverted from Kern River, in priority 5th, above "Second Point." (z) These crops irrigated; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Feet.				Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
			Gross.	Net.																				
			Feet.	P. ct.																				
7-Z	Continued from page 156. Slone Canal (a) (b).....	10,460 10,650 10,500 11,314 9,032	2,70 2,10 2,30 2,01 3,16	2,20 1,80 1,80 1,48 2,50	38.9 41.1 39.9 26.4 18.8	1916 1917 1918 1919 1920	..... ..... ..... 47.8 40.4	..... ..... ..... 0.3 0.4	..... ..... ..... 42.2 41.6	..... ..... ..... 9.7 11.0	10.0 6.0 10.0 40.4	1.9 1.7 18.9	4.5 11.4 3.2	12.2 14.9 8.0	10.8 11.5 13.5	14.0 15.4 16.5	7.8 17.2 16.5	8.1 5.6 1.0	0.2 4.4 1.6	7.4 4.4 12.3	8.3 4.4 4.7	8.8 1.3 3.4	
8-A	Ensher and Alexander Farm	215 555 555	1.54 1.52 1.76	25.6 9.9 9.9 10.8 72.1 7.2 18.6 1.4 3.8 6.0 6.9 6.2 12.8 13.3 12.8 12.7 9.1 1.3 4.8 21.0
8-C	Boston Land Co.....	.....	.....	0.50	.....	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9-B	McNeil Irrigation Co., San Luis Obispo County (c).....	51 51 51	1.14 1.04 0.78	1.14 1.04 0.78	..... ..... .....	1919 1920 1921	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....
9-C	Santa Maria Water Co. (d) (e).....	8,000	3.00	2.50	.....	1915	.....	.....	.....	.....	4100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9-D	Gobernador Land and Water Co., Santa Barbara County (f) (j).....	300	.....	1.20	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10-A	Spreckels Sugar Co., Ranch No. 1, Monterey County.....	1,372	.....	1.58 3.00 1.50	..... ..... .....	1900 m m	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....
10-B	Salinas Valley (n).....	1,316 356	..... .....	1.32 1.23	..... .....	1900 1900	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....	..... .....
11-A	Alameda County Water Dist. (o).....	6,619	.....	1.05	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11-B	Sixty pumps (p) (q).....	2,272	.....	1.13	.....	1918 1919 1904	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....	..... ..... .....

REMARKS—(a) Water diverted from Kern River, in priority 5th, above "Second Point." (b) From 4th Div. Rpt., State Dept. of Eng. and original notes of Bull. 9, State Dept. of Eng. by S. T. Harding, 1921. (c) From rpt. on Arroyo Grande, San Luis Obispo County, by G. W. Rhodes, San Francisco. (d) Irrigation. (e) From U. S. D. A. data collected by C. E. Post. (f) Estimated. (g) Average of variable. (h) Sugar beets. (i) Reported to irrigate once in a season. (j) Near Carpinaria. (k) Water used for 6 months; monthly amounts unknown. (l) From O. E. S. Bull. 100, U. S. D. A., 1899-1900, by C. D. Marx. (m) From W. S. Paper No. 83, U. S. G. S., by H. Hamlin. (n) From 4th Div. Rpt., State Dept. of Eng. (o) From State Dept. of Pub. Works, Div. of W. Res., rpt. by Paul Bailey, Sacramento. (p) These canals irrigate an area along the foothills from Cupertino to Guadalupe River. (q) Irrigation in Santa Clara County. (r) From O. E. S. Bull. 135, U. S. D. A., 1906.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.														
			Area				Alfalfa.	Trees, fruit, vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
			Gross.	Net.																			P. ct.	P. ct.	P. ct.
11-B	Pioneer Canal, Santa Clara County (a)	900	3.34	2.50	25.0	1904																			
	(b)	200	4.39	3.29	25.0	1912																			
11-B	Sorosis Canal, Santa Clara County (a)	3,021	1.75	1.31	25.0	1904																			
	(b)	150	2.67	2.00	25.0	1912																			
11-B	Kirk Canal, Santa Clara County (a)	415	2.29	1.60	30.1	1912																			
11-B	Paul Massum, Santa Clara County (a)	45	7.67	3.10	59.6	1912																			
11-B	Stadler Canal, Santa Clara County (d)	1,961	1.58			1904																			
11-D	Pajaro Valley Pumping Plants (b)	776		3.75		1909					100.0														
12-A	Delta Lands of Sacramento and San Joaquin Rivers (f)	470,000		91.14		1920	3.50	6.20	54.2	36.1				1.0	1.8	6.0	22.3	25.1	21.9	14.9	4.5	1.9			
13-B	El Camino Irrigation Dist., Tehama County (b)	620	1.32	1.22	8.0	1921	8.40	4.70	57.4	29.5															
13-C	Los Molinos, Tehama County (i)	7,112		6.30		1913	100.0																		
13-C	Los Molinos Land Co., (Coneland Water Co.), Tehama County (i)	8,103		4.96		1914	100.0									18.6	19.2	21.1	18.7	18.3	1.1				
		7,576	7.32	5.30	27.5	1916	65.0				35.0				11.4	19.6	18.9	17.0	17.8	15.3					
		7,658	7.22	5.23	27.5	1917									10.5	15.6	18.1	17.9	15.8	13.1	9.0				
		8,206	5.11	3.70	27.5	1918									12.6	22.9	21.9	17.3	15.5	9.8					
		9,453	5.51	3.99	27.5	1919									13.0	20.3	18.3	15.8	14.1	13.1	5.4				
		10,003	4.46	3.22	27.5	1920									10.6	21.8	20.3	16.7	13.5	12.4	4.7				
		10,003	5.26	3.81	27.5	1921									8.1	17.7	17.7	19.8	15.5	12.9	8.3				
13-D	Stanford Vina Ranch, Tehama County (m)	3,478	4.48			1921	66.2	7.2	5.1	21.5						24.6	15.5	24.7	19.5	15.7					

REMARKS.—(a) These canals irrigate an area along the foothills from Cupertino to Guadalupe River. (b) From 4th Bien. Rpt., State Dept. of Eng. (c) Net use about 25 per cent less than gross. (d) From 3d Bien. Rpt., State Dept. of Eng. (e) From C. E. Grunsky, San Francisco. (f) Estimated; based on power consumption and observation on selected areas. No allowance made for water drawn by plants from underground seepage into area. (g) From O. R. Smith, Eng. for El Camino Irrig. Dist. (h) From Bull. 3, State Dept. of Eng. (i) Weighted average for 9 farms. (k) Weighted average for 10 farms. (l) From records of company. (m) From F. D. Robson, Mgr. (n) These crops irrigated; areas unknown.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																													
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																		
																							P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
13-F	Farms near Orland, Glenn County (a) ..	170 233	..... .....	63.97 c4.44	P. ct.	1913 1914	100.0 100.0	..... .....	..... .....	..... .....	6.5	5.5	23.7	18.5	15.1	9.4	2.8	..... .....	..... .....	..... .....	..... .....															
13-F	Orland Project, U. S. R. S., Glenn County	128 703 2,441 2,663 4,230	5.06 6.94 7.00 3.40 8.05	4.50 3.40 3.90 3.93	10.0 51.0 73.0 50.9 50.1	d1906 e1910 e1911 f1912 f19	98.0 89.0	2.0 11.0																		
13-H	Durham State Land Colony, Butte County (i) ..	3,000	2.70	.....	.....	1920	60.0	.....	.....	40.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....								
13-K	Farms near Willows, Glenn County (j) ..	k114 167	.....	1.62 1.76	.....	1914 1915	100.0 100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....					
13-M	Glenn-Colusa Irrigation Dist. (m) ..	n493	.....	2.30	.....	1920	63.6	.....	.....	36.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....								
13-M	Central Canal, Glenn and Colusa Counties (d) ..	2,000	8.40	.....	.....	1907	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
13-M	Sacramento Valley West Side Canal Co., Glenn and Colusa Counties (o) ..	3,448 5,800 16,906 16,111 12,265 11,940	9.80 6.00 4.10 4.30 5.40 4.50	..... ..... ..... ..... 3.00	..... ..... ..... ..... 33.2	1910 1911 1912 1913 1914 1915	..... ..... ..... ..... 52.1 .....	..... ..... ..... ..... 17.5 .....	..... ..... ..... ..... 18.3 12.1	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... .....							

Continued on next page.

Continued on next page.

REMARKS—(a) From Bull. 3, State Dept. of Eng. (b) Weighted average for 5 farms. (c) Weighted average for 8 farms. (d) From O. E. S. Bull. 207, U. S. D. A. (e) From Irrigation Practice and Engineering, by B. A. Echeverry. (f) From 4th Bien. Rpt., State Dept. of Eng. (g) From Reclamation Record, U. S. R. S., Vols. 1 to 11. (h) Crop census compiled from detailed tabulations in Reclamation Record. (i) Estimate of Geo. C. Kreuzer, Supt. of Bull. 3, State Dept. of Eng. (k) Weighted average for 6 farms. (l) Weighted average for 4 farms. (m) From district. (n) From In T. 15 and 16 N., R. 3 W. (o) From office of E. C. Mills, Willows; prepared by J. P. Ryan. (p) Rice, 1.2 per cent of total crops. (q) Net monthly amounts of water. (r) Water used; quantity known. (s) These crops irrigated; quantities unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.			Monthly use in per cent of annual use.												
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
13-R	Continued from page 160. Sutter-Butte Canal Co., Butte County (a)	Acres.	Feet.	Feet.	P. ct.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		38,000	6.06	2.38	100.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		36,000	6.46	2.57	100.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		41,000	6.48	2.57	100.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		43,000	6.85	2.57	100.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
13-G	RICE PREDOMINATING CROP. Parrott and Phelan Plant near Chico, Butte County (i).	Acres.	Feet.	Feet.	P. ct.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		3,100	10.00	10.30	5.4	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		3,000	10.90	10.30	5.4	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		14,500	9.10	8.50	0.6	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		5,789	7.02	7.58	100.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
13-I	Western Canal Co., (Great Western Power Co.), Butte County, below Oroville (o).	Acres.	Feet.	Feet.	P. ct.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		12,385	7.02	5.73	9.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		19,407	6.22	5.73	9.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		21,509	5.84	5.35	9.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		5,535	5.29	4.90	7.4	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
13-J	Farms east of Sacramento River, Butte County.	Acres.	Feet.	Feet.	P. ct.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		62,881	8.45	5.17	38.8	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		49,781	8.53	8.53	100.0	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		21,706	8.00	6.27	28.2	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		508,152	8.74	6.27	28.2	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
13-M	Sacramento Valley West Side Canal Co. (j).	Acres.	Feet.	Feet.	P. ct.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		22,183	8.74	5.65	40.7	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		22,183	8.74	5.65	40.7	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		22,183	8.74	5.65	40.7	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	
		22,183	8.74	5.65	40.7	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	

Continued on next page.

Remarks.—(a) From company. (b) Rice, 44 per cent. (c) Rice, 51 per cent. (d) Rice, 40 per cent. (e) Rice, 57 per cent. (f) From An. Rpts. of company to State R. R. Comm. (g) From Polk and Robinson, Chico. (h) Rice, 98 per cent. (i) Season from May 5 to Oct. 6. (m) Season from May 5 to Oct. 8. (n) From Mr. Orchard, Mar., Oroville. (o) Rice, 100 per cent. (p) Rice, 84 per cent. (q) Rice, 100 per cent. (r) From Bull. 325, Univ. of Calif., Agr. Exp. Sta. (s) Weighted average for 5 farms. (t) Weighted average for 7 farms. (u) From State Dept. of Pub. Works, Div. of W. Rts., rpt. by H. M. Stanford, Sacramento. (v) Water used; quantity unknown. (w) Weighted average for 5 farms. (x) Weighted average for 5 farms between Marysville and Sacramento. (y) Weighted average for 2 of 5 farms under (z). (aa) Monthly amounts for net use. (ab) Weighted average for 2 tracts in the Sutter Basin, a portion of the four tracts in (z). (ac) Tract in Sutter Basin. (ad) From Glen-Coloma Irrigation Dist. (ae) In Sec. 4, T. 18 N., R. 3 W., and Sec. 32, T. 19 N., R. 5 W. (af) Stone Corral lateral. (ag) Lathrop, Q. E. and Spaulding laterals.

Continued on next page.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Feet.	Feet.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
13-M	Continued from page 161. Sacramento Valley West Side Canal Co., Glenn and Colusa Counties.....	Acres.	32,984	6.58	4.09	38.0	1918																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

REMARKS—(a) From Glenn-Colusa Irrigation Dist. (b) From office of E. J. Mills, Willows; prepared by J. P. Ryan, Willows. (c) Rice, 82 per cent. (d) Rice, 48 per cent. (e) Rice, 56 per cent. (f) Rice, 69 per cent. (g) Rice, 73 per cent. (h) Rice, 83 per cent. (i) In Sec. 31, T. 17 N., R. 3 W. (j) In T. 15 and 16 N., R. 3 W. (k) About 11 per cent of acreage in alfalfa and rice converted into rice acreage by use of 0.5 as a conversion factor. (l) In T. 18 N., R. 3 W. (m) In T. 19 N., R. 3 W. (n) In T. 20 N., R. 3 W. (o) Total for whole district. (p) In T. 15 and 16 N., R. 3 W. (q) Rice. (r) Rice. (s) At lateral headgates. (t) From Willows and Knights Landing, Div. of W. Res. rpt. by H. M. Stafford, Sacramento, on duty of water for rice. (u) Weighted average for 6 tracts near Knights Landing. (v) Weighted average for 4 tracts between Willows and Knights Landing. (w) Weighted average for 6 tracts between Willows and Arbuckle. (x) Weighted average for 8 tracts between Willows and Arbuckle. (y) Water used; quantities unknown. (z) Tracts used; quantities unknown. (aa) Weighted average for 7 tracts between Willows and Knights Landing. (ab) From Bull. 395, Univ. of Calif., Agr. Exp. Sta. (ac) Weighted average for 13 farms. (ad) Average of all data collected by H. M. Stafford in rpt. to State Dept. of Pub. Wks., Div. of W. Res. (ae) From Farm Land Inv. Co., San Francisco.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in con- vey- ance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Gross.				Net.		Al- falfa.	Tree vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
			Feet.	P. ct.			Feet.	P. ct.																
13-Q	Farm Land Investment Co., near Marys- ville (a).....	61,350	66.44	.....	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		61,350	66.44	.....	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		62,000	68.00	.....	.....	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13-Q	Cordun Irrigation Dist. (d).....	2,280	.....	5.90	.....	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13-Q	South Feather Land and Water Co., Yuba County.....	1,250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1,200	5.83	3.64	35.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1,600	.....	5.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1,900	.....	5.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13-R	Sutter Mutual Water Co. (g).....	7,798	8.25	6.07	27.9	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		7,594	6.80	5.65	16.9	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		2,104	12.61	7.39	41.4	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13-R	Sutter-Butte Canal Co., Butte County.....	14,000	7.53	4.90	34.9	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		25,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		31,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		34,300	5.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		38,000	6.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		36,000	6.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		41,000	6.48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		43,000	6.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		52,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		50,750	6.31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13-S	Farms between Marysville and Wheat- land (p).....	2,458	7.03	.....	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13-T	Reclamation District No. 108 (q).....	1,106	6.71	5.41	19.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		3,547	7.96	5.89	26.0	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		4,472	7.77	.....	.....	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		5,005	8.55	.....	.....	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		14,210	7.44	.....	.....	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Continued on next page.

REMARKS—(a) From company. (b) Computed from estimated area and water used. (c) Rice. (d) State Dept. of Pub. Wks., Div. of Eng. and Irrig., rpt. by J. B. Brown, Sacramento. (e) From 4th Bien. Rpt., State Dept. of Eng. (f) From An. Rpt. of company to State R. R. Comm. (g) From R. L. Jones, Sacramento. (h) State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (i) Rice, 37 per cent. (j) Rice, 44 per cent. (k) Rice, 36 per cent. (l) Rice, 51 per cent. (m) Rice, 49 per cent. (n) Rice, 52 per cent. (o) Rice, 57 per cent. (p) From W. Lewis and H. Walters, managers of the Fleming, Harding and Hammond Ranch. (q) From rpt. to district by F. H. Tibbels, San Francisco. (r) Season 1914 days. (s) Season 1915 days. (t) Season 1916 days. (u) Season 1917 days. (v) Season 1918 days. (w) Season 1919 days. (x) Water used; quantity unknown. (y) From drainage. (z) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																		
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.							
																							P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
							Acres.	Feet.	Feet.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
13-T	Continued from page 163. Reclamation Dist. No. 108 (a) (b).....	9,090	6.37	3.87	39.0	1921										45.9	20.4	21.2	12.2	0.3									
13-U	Sacramento Valley (c) (d).....	1,762		3.28		1913		100.0								5.2	1.8	20.2	18.8	23.4	15.3	13.6	1.7						
13-W	Natomas Company of California (e)....	1,852	1.78	0.89	50.0	1918		1.0			99.0						11.1	42.6	31.9	22.1	2.3								
		4,155	2.42	1.12	53.8	1919		5.8	0.8	1.5	91.9						13.1	23.2	42.4	16.1	5.2								
		4,425	2.37	1.15	51.6	1920		12.2	1.0	1.5	85.3						7.3	41.6	35.0	10.7	5.8	0.2							
		3,243	1.98	1.00	50.0	1921		24.8	5.6		69.6						19.4	38.5	20.7	14.6	6.8								
13-X	Farms near Woodland, Yolo County....	295 1,178 12,419	2.76 1.82 1.11			c1913 c1914 f1913		100.0 100.0						14.8		16.5	17.1	31.0	7.1	11.7	1.8								
13-X	Moore Ditch, Yolo County (f).....	6,598	3.15			1906		k																					
13-X	Yolo Water and Power Co., Yolo County (f).....	18,843 9,989 11,358 15,912 23,524 23,300 20,906 12,536 19,078 390 7,517 12,652 10,000 6,141 5,500	1.81 1.54 1.71 4.26 4.46 3.18 3.52 3.08 3.08 6.38 6.31 5.35 4.64 7.75 5.91			1913 1914 1915 1916 1917 1918 1919 1920 1921 1915 1916 1917 1918 1919 1920		51.0 93.0 87.0 4.0 p100.0 q100.0 r100.0 s100.0 t100.0 u100.0 v100.0 w100.0 x100.0 y100.0 z100.0	9.0 3.6 6.0 p100.0 q100.0 r100.0 s100.0 t100.0 u100.0 v100.0 w100.0 x100.0 y100.0 z100.0	40.0 4.0 4.0 p100.0 q100.0 r100.0 s100.0 t100.0 u100.0 v100.0 w100.0 x100.0 y100.0 z100.0		25.0 20.0 0.2 0.5 1.0 1.0 22.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0	20.0 21.0 0.3 11.6 15.0 16.0 45.0 13.0 20.0 20.0 20.0 20.0 20.0 20.0	24.0 32.0 1.5 18.0 15.0 16.0 15.6 13.0 20.0 20.0 20.0 20.0 20.0 20.0	14.0 25.0 17.0 23.0 23.0 24.0 21.0 13.0 5.0 5.0 5.0 5.0 5.0 5.0	9.0 20.0 29.0 23.0 20.0 22.0 20.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4.0 8.0 16.0 16.0 14.0 15.0 17.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0	3.0 8.0 9.0 7.0 4.0 3.0 3.0 1.0 2.0 3.0 3.0 3.0 3.0 3.0	1.6 1.0 2.0 2.0 0.5 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0										

End of Rice Data.

(End of Rice Data.)

REMARKS—(a) From rpt. to district by F. H. Tibbatts, San Francisco. (b) From rpt. to State Dept. of Pub. Wks., Div. of W. Res., on duty of water for rice, by H. M. Stafford. (c) From Bull. 3, State Dept. of Eng. (d) Weighted average for 62 farms at Gridley, Los Molinos, Orland, Willows, Woodland and Dixon for years of 1913 and 1914. (e) Sacramento County between Sacramento River and American River. Includes Central, Elkhorn, and Riverside Mutual Water Companies. Information from the companies. (f) From Bull. 4, State Dept. of Eng. (g) Weighted average for 12 farms. (h) Weighted average for 14 farms. (i) Weighted average for 48 farms. (j) From O. E. S. Bull. 207, U. S. D. A. (k) Principal crop. (l) From company. (m) Year of water shortage. Due to litigation no water could be taken from Clear Lake. (n) Rice, 3 per cent. (o) Rice, 47 per cent. (p) Rice, 47 per cent. (q) Rice, 53 per cent. (r) Rice, 63 per cent. (s) Rice, 29 per cent. (t) Less than one-half of one per cent used this month. (u) Rice. (v) Rice. (w) Rice. (x) Rice. (y) Rice. (z) Rice. (aa) Rice. (ab) Rice. (ac) Rice. (ad) Rice. (ae) Rice. (af) Rice. (ag) Rice. (ah) Rice. (ai) Rice. (aj) Rice. (ak) Rice. (al) Rice. (am) Rice. (an) Rice. (ao) Rice. (ap) Rice. (aq) Rice. (ar) Rice. (as) Rice. (at) Rice. (au) Rice. (av) Rice. (aw) Rice. (ax) Rice. (ay) Rice. (az) Rice. (ba) Rice. (bb) Rice. (bc) Rice. (bd) Rice. (be) Rice. (bf) Rice. (bg) Rice. (bh) Rice. (bi) Rice. (bj) Rice. (bk) Rice. (bl) Rice. (bm) Rice. (bn) Rice. (bo) Rice. (bp) Rice. (bq) Rice. (br) Rice. (bs) Rice. (bt) Rice. (bu) Rice. (bv) Rice. (bw) Rice. (bx) Rice. (by) Rice. (bz) Rice. (ca) Rice. (cb) Rice. (cc) Rice. (cd) Rice. (ce) Rice. (cf) Rice. (cg) Rice. (ch) Rice. (ci) Rice. (cj) Rice. (ck) Rice. (cl) Rice. (cm) Rice. (cn) Rice. (co) Rice. (cp) Rice. (cq) Rice. (cr) Rice. (cs) Rice. (ct) Rice. (cu) Rice. (cv) Rice. (cw) Rice. (cx) Rice. (cy) Rice. (cz) Rice. (da) Rice. (db) Rice. 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TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.	Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.			Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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13-Y	Dixon, Solano County	a206 68	3 08 2 38	b1913 c1907	100 0	4 1	10 4	14 3	16 0	20 0	13 6	14 9	6 7

REMARKS—(a) Weighted average for 7 farms. (b) From Bull. 3, State Dept. of Eng. (c) From 14th Bien. Rpt., State Dept. of Eng. (d) Estimated from estimated efficiency of pumping plant, monthly water bills, and estimate of water used on alfalfa and other crops. (e) From company. (f) Measurements reported to be of low accuracy. (g) From rpt. to company by I. E. Goodner and S. E. Keller, San Francisco. (h) Average for 53 users for the years 1912-1916, from 0.4 to 0.5 ac ft. per acre. (i) From rpt. to Div. of W. Rts. on April 92 and 93, May 8, 1916, by G. W. Davis. (j) Season 150 days. (k) Estimated losses. (l) Includes user voir losses. (m) From Mr. Edwards, Ch. Engr. (n) Distribution at head of ditch. Season given as extending from May 1 to 15 to between Sept. 1 and Oct. 1. (o) From Mr. Johnson, company's mgr., Marysville Dist. (p) Old. (q) Season from May 25 to Sept. 12. (r) Season from May 1 to Sept. 30. (s) Season from May 4 to Oct. 5. (t) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. (u) Domestic supply of Thermaito included. (v) Season from May 1 to Oct. 31. (z) These crops irrigated; area unknown. (y) This monthly use sums up to only 98 per cent. (z) From data on Case 627, State R. R. Comm.

Continued on next page.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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REMARKS—(a) From data on Case 627, State R. R. Comm. (b) From 4th Bien. Rpt., State Dept. of Eng. (c) Indicates large canal loss. (d) From 6th Bien. Rpt., State Dept. of Eng. (e) From An. Rpt. of company to State R. R. Comm. (f) Season 1915 days. Rpt. on duty of water on lands irrigated by Excelsior M. and W. Co., by J. B. Brown, for U. S. Irrigation Investigation. (g) From State Dept. of Pub. Wks., Div. of W. Rts.; rpt. by D. M. Baker on April, 1915, June 23, 1921. (h) Average of 6 years, 1916 to 1921, inclusive. (i) From O. E. S. Bull. 254, by Frank Adams (j) Weighted averages for 9 farms. (k) Rice, 22 per cent. (l) From company. (m) Computed from area and record of delivery in miner's inches on a basis of a 160-day season. (n) Computed from inches diverted and inches sold for month of August. (o) From 13th U. S. Census, 1910. (p) From Terra Bella rpt. by S. E. Keiffer, San Francisco, 1915. (q) Second of 2 dry years. (r) Water used; quantity unknown. (s) These crops irrigated; area unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use, in per cent of annual use.												
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
14-Q	El Dorado Water Co., El Dorado County (a).	4,000	Feet.	1.03	P. ct.	1919					0.1	0.3	0.4	0.4	4.4	17.4	26.4	28.6	17.4	2.8	1.5	0.3	
		4,000		1.05		1920						0.5	0.3	0.4	2.7	19.8	30.1	30.2	13.3	2.7			
14-R	American Canyon Water Co., Placer County (b)	4,000		0.75		1911			100.0														
14-T	Fair Oaks Irrigation Dist., Sacramento County	3,716		0.90		1914			100.0														
					41.53		1919																
14-T	Natomas Water Co., Sacramento and El Dorado Counties (a)	15,000		2.00		1913																	
		1,300				1920						0.5	0.5	5.7	10.8	15.9	15.5	15.4	10.6	5.5	3.6	0.5	
14-V	Michigan Bar.					e										10.0	20.0	30.0	25.0	10.0	5.0		
15-B	Rancho Lenoso, Napa County (f) (g)	1,500	2.00	41.50	425.0	1921	47.0	20.0			33.0												
15-C	Napa Valley, Napa County (i)	36	42.89	2.17	425.0	1911	100.0																
		5	42.00	1.50	425.0	1911	100.0																
16-A	Klamath Project, U. S. R. S. (j).	21,000	2.00	1.30	35.0	1909					43.2	32.8											
		27,108	1.55	0.90	42.0	1910	24.0																
		23,869	1.93	1.20	38.0	1911																	
		23,834	1.77	1.13	36.1	1912																	
		18,928	2.01	1.17	41.8	1913																	
		24,440	2.19	1.26	42.5	1914																	
		27,254	2.57	1.42	56.4	1915																	
		29,351	2.25	1.02	54.7	1916																	
		33,635	1.95	0.98	49.8	1917	29.5				44.8	25.7											

Continued on next page

Continued on next page

REMARKS—(a) From An. Rpts. of company to State R. R. Comm. (b) From company. (c) From Terra Bella rpt., by S. E. Keiffer, San Francisco, 1915. (d) From rpt. by S. E. Keiffer on North Fork Ditch Co., 1920. (e) From Director, U. S. G. S. (f) Diversion from Horse Thief Creek and Front Creek to irrigate in Berryessa Valley, Napa County. (g) From State Dept. of Pub. Wks., Div. of W. Rts.; Appl. by J. C. Knowles. (h) Estimated. (i) From 3d Bien. Rpt., State Dept. of Eng. (j) Includes entire project in Oregon and California. (k) From Rpts. of U. S. Engineers. (l) From Irrigation Practice and Engineering, by B. A. Etchevery. (m) From Reclamation Record of U. S. R. S., Vols. 1 to 11. (n) Water used; quantity unknown.

TABLE 8.

TABLE 8—(Continued). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.													
			Acres.				Alfalfa.	Trees.	Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
			Gross.	Net.																				P. ct.
16-A	Continued from page 167.	Klamath Project, U. S. R. S. (a) (b).....	33,268	3.18	1.36	57.2	1918	34.4			36.6	29.0				1.5	27.9	28.7	21.3	17.6	3.0			
			56,490	2.40	1.32	45.0	1919	41.2			57.7	1.1				0.2	22.9	27.2	23.5	21.3	4.9			
			49,754	2.65	1.11	58.1	1920	40.7			58.5	0.8				0.7	21.3	28.1	19.6	26.3	4.0			
16-B	Cottonwood Irrigation and Mining Co. (c) (d).....		e470	e1.61		1913										1.6	31.2	10.2	28.8	23.8	4.4			
			e480	e1.34		1914										4.9	18.8	33.2	26.7	8.9	5.8	2.3		
			e490	e1.21		1915										4.5	16.1	39.4	27.8	5.6	3.0	3.6		
			f500	f1.38		1916										3.5	10.4	32.6	26.7	21.4	4.8	0.6		
			e490	e1.40		1917											10.9	31.9	28.2	9.8	5.6	4.5	4.3	4.8
			e620	e0.71		1918										21.6	68.4	9.9	0.1					
			e900	e1.26		1919										6.3	20.7	23.4	19.1	12.5	11.8	3.6	2.6	11.7
			e1,200	e0.74		1920							3.5	3.2	3.5	16.1	32.3	22.2	7.5					
			4,498	4.20		1912																		
			165		7.35		1912																	
16-D	Little Shasta Valley Springs (h).....	Terwilliger No. 1 (g) (h).....	180	1.61			1912										22.0	31.0	29.0	7.0	11.0			
							1912									15.0	14.0	21.0	22.0	15.0	13.0			
							1912									21.0	20.0	16.0	14.0	13.0	16.0			
			365	6.60			1912									26.0	23.0	17.0	10.0	11.0	13.0			
			625	4.90			1912									21.0	33.0	21.0	4.0	5.0	16.0			
			418	5.20			1912									19.0	19.0	16.0	16.0	8.0	22.0			
			1,665	1.30			1912										55.0	38.0	1.0			6.0		
			100	6.40			1912									19.0	20.0	13.0	13.0	17.0	18.0			
			645	3.90			1912									16.0	17.0	16.0	17.0	17.0	17.0			
			170	5.70			1912																	

REMARKS—(a) Includes entire project in Oregon and California. (b) From Reclamation Record, U. S. R. S. (c) Water diverted from Cottonwood Creek to irrigate near Hornbrook. (d) From An. Rpts. of company to State R. R. Comm. (e) Estimated. (f) Measured. (g) Shasta Valley. (h) From 4th Bien. Rpt., State Dept. of Eng. (i) Pasture. (z) These crops irrigated; area unknown.

TABLE 8.

TABLE 8—(Concluded). USE OF WATER AS MEASURED ON VARIOUS SYSTEMS.

Section and key letter.	System.	Area irrigated.	Annual use in depth on land.		Loss of diverted water in conveyance.	Year.	Area of crops in per cent of total.				Monthly use in per cent of annual use.														
							Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
			Gross.	Net.																			P. ct.	P. ct.	P. ct.
16-D	Martin (a) (b).....	165	8.70	.....	P. ct.	1912	.....	.....	.....	.....	.....	.....	.....	.....	18.0	18.0	16.0	16.0	16.0	.....	.....	.....	.....	.....	.....
16-D	Stallcup Farm, Little Shasta Valley (b) ..	310	.....	9.03	.....	1912	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-I	Pit River Ditch and Dam Co. (c).....	950	4.16	3.75	9.9	1910	30.0	.....	30.0	40.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-I	Thirty-two tracts on Pit River (d).....	31,700	.....	2.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-J	Pit River Valleys, near Alturas.....	.....	.....	€2.00	.....	.....	100.0	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	€2.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	.73 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	ed1 00	.....	.....	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	ed2 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	.73 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		.....	.....	ed6 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-L	Jess Valley (i).....	25,000	2.67	2.00	25.0	1920	y	.....	y	y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-N	Union Land and Stock Co. (j) .....	.....	.....	1.00	.....	1891	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-P	Lasso Irrigation Co. (c).....	5,000	.....	2.07	.....	1910	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-S	Round Valley Reservoir (k).....	.....	2.00	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS—(a) Shasta Valley. (b) From 4th Bien. Rpt., State Dept. of Eng. (c) From 13th U. S. Census, 1910. (d) From A. M. Green, Alturas. (e) Estimated. (f) By W. J. Dorris, Alturas. (g) Meadows. (h) Water grass in lake bottoms. (i) From U. S. R. S. Rpt. by E. T. Erickson, Orland. (j) From Rpt. on irrigation for Honey Lake Land Co., by Taylor, Grunsky and Ninto. (k) To irrigate in Indian Valley. (l) From J. A. Bumgar, Oroville. (m) Water used; quantity unknown. (n) These crops irrigated; area unknown.

TABLE 9.

TABLE 9. USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use in per cent of annual supply.															
			Gross.	Net.			Alfalfa.	Trces. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.				
																							Feet.	P. ct.	P. ct.	P. ct.
1-B	Santa Clara River Valley, Ventura County. (a)	120,000	1.50	1.00	33.3	1912																				
1-C	C. E. Tait. (a)			3.00		1912																				
	C. E. Tait. (a)					1912	100.0																			
1-G	San Fernando Valley, Los Angeles County. (a)	105,000		2.00		1912																				
	C. E. Tait. (a)			2.00		1912																				
1-M	Bd. Pub. Service Comm.		2.00			1912																				
	San Gabriel Valley. (a)	70,000	{ 2.00			1912																				
1-Q	Pomona Valley and Cucamonga Plains. (a)	55,000		0.80		1912																				
	C. E. Tait. (n)			2.40		1912	100.0																			
1-R	C. E. Tait. (a)					1912																				
	C. E. Tait. (n)	100,000		{ 1.00		1912																				
1-S	San Bernardino Valley and Riverside Area. (a)			to 2.00		1912																				
	C. E. Tait. (n)			63.50		1912	100.0																			
1-T	C. E. Tait. (n)			2.00		1912																				
	Temescal Water Co. (c) (d)					1912																				
1-U	H. R. Case. (e)					1912																				
	San Jacinto Valley and Corona Area. (a)	40,000		e2.00		1912																				
1-V	C. E. Tait. (n)					1912																				
	Santa Ana River Lands. (a)	279,000		41.35		1912																				
1-W	C. E. Tait. (n)			41.00		1912																				
	C. E. Tait. (a)			53.50		1912	100.0																			
1-X	Orange County Coastal Plain and Mesa. (a)	60,000		m1.30		1912																				
	C. E. Tait. (n)					1912																				

REMARKS—(a) From Rpt. of Conservation Comm. of the State of California, 1912. (b) On a basis of 1 miner's inch for 2 or 3 ac. (c) Lands near Corona. Season 260 days. (d) From State Dept. Pub. Wks. Div. of Eng. and Irrig. files. (e) On a basis of 1 miner's inch for 5 ac. (f) Irrigation season 250 days. (g) Includes Pomona Valley and Cucamonga Plains; San Bernardino Valley and Riverside; Yucaipa Valley and San Geronimo Pass; San Jacinto Valley and Corona. (h) On a basis of 1 miner's inch for 7 or 8 ac. (i) On basis of 1 miner's inch for 10 ac. (j) On basis of 1 miner's inch for 3 ac. (k) Citrus. (l) Deciduous. (m) On a basis of 1 miner's inch for 5 to 10 ac. (n) Of Los Angeles. (o) Of Corona. (p) These crops to be grown; areas not estimated. (q) Water to be used; quantity not estimated.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use, in per cent of annual supply.											
			Gross.	Net.	P. ct.		Alfalfa.	Trces. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2-A	Yucapra Valley and San Geronimo Pass. (a)	Acres.																				
2-D	C. E. Tait. (d)	24,000		61.00		1912																
2-D	Volcan Land & Water Co. (c)			2.00																		
2-D	J. B. Lippincott. (d)			1.50																		
2-D	J. S. Longwell. (f)			1.50																		
2-D	San Dieguito Mutual Water Co. (e)																					
2-D	J. S. Longwell. (f)																					
2-D	San Luis Rey; Tescondido; San Ysa-bel Valleys and Linda Vista Mesa. (a)																					
2-D	C. E. Tait. (d)	51,600		61.00		1912																
2-D	Linda Vista Mesa. (h)																					
2-D	C. E. Tait. (d)			1.00		1920		100.0														
2-D	C. E. Tait. (d)			1.50		1920				100.0												
2-E	Spring Valley Irrigation Dist. (c) (i)																					
2-E	J. B. Lippincott. (d)	12,000		1.00		1914																
2-E	Sweetwater Valley and Chula Vista Mesa. (a)																					
2-E	C. E. Tait. (d)	7,500		1.00		1912																
2-E	El Cajon Valley. (c)			1.50																		
2-E	J. S. Longwell. (f)			31.00																		
2-E	Ed. Fletcher. (d)																					
2-E	Olney and Via Juma Valleys. (a)																					
2-E	C. E. Tait. (d)	3,000		61.00		1912																
3-F	Imperial Valley.																					
3-F	C. E. Tait. (a) (d)	400,000		1.75		1912																
3-F	C. E. Tait. (d) (e)			3.00		1922																
3-F	Yuma Project, U. S. R. S.																					
3-F	U. S. R. S. (b)	65,000		3.00		1921																

REMARKS—(a) From Rpt. of Conservation Comm. of the State of California, 1912. (b) On a basis of 1 miner's inch to 10 ac. (c) Irrigation season 250 days. (d) Of Los Angeles. (e) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files. (f) Of Powell, Wyo. (g) Irrigation season 270 days. (h) Rpt. on use of water on Linda Vista Mesa, U. S. D. A. (i) Consulting Engr's. rpt. to La Mesa, Lemon Grove and Spring Valley Irrigation Dist. (j) Water to be used in East San Diego. (k) 20th An. Rpt., U. S. R. S. (2) Water to be used; quantity not estimated.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth of land.		Estimated loss of water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use in per cent of annual supply.											
			Gross.	Net.	P. ct.		Alfalfa.	Trees.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
4-A	Palmdale Water Co. J. B. Lippincott. (a) (b)	Acres. 6,000	Feet. 1.00	Feet. 1.00	P. ct. 1915		P. ct. 100 0	P. ct. 100 0														
4-A	F. C. Finkle. (b) (c)	6,000	1.00	1.00	ø	1916		100 0														
4-D	Palmdale Irrigation Dist. (d) (e)	4,400	1.36	1.36	ø	1918		100 0														
4-D	Frank Adams. (f)	4,400	2.36	2.36	ø	1918		100 0														
4-D	Mojave River Irrigation Dist. (h)	417,092	1.50	1.50		1921							10.0	14.0	16.7	18.0	18.0	16.0	7.3			
4-D	Victor Valley Irrigation Dist. (j)	467,000	1.00	1.00		1917																
4-D	J. B. Lippincott. (b)	43,200	1.50	1.50		1917																
4-D	Victor Valley. (m)	325,000	n1.36	n1.36		1917	20	20														
4-D	J. B. Lippincott. (b)	44,000	k1.25	k1.25		1917	20	20														
4-D	J. B. Lippincott. (b)	269,000	11.50	11.50		1917	20	20														
5-A	Newlands Proj., U. S. R. S.		4.50	2.70		1917																
5-A	L. H. Taylor. (p) (q)		4.14	3.00		1921																
5-C	D. C. Henry. (r) (s)	187,000	3.00	3.00		1921																
5-C	U. S. R. S. (t)		2.83	2.30	18.7	1921			25.0	25.0				10.0	14.0	21.0	21.0	18.0	16.0			
5-C	T. H. Means. (w) (z)	11,400	2.83	2.30		1921																
6-A	Oakdale Irrigation Dist.	62,000	2.50	2.50		1914				100.0												
6-A	W. F. McClure. (aa)	25,000	b62.50	b62.50		1920	100.0															
6-A	H. H. Wadsworth. (b) (w)		b63.00	b63.00		1920	100.0															
6-A	Burton Smith. (b) (gg)	27,000	1.50	1.50		1920		100.0														
6-A	H. H. Wadsworth. (b) (w)		b66.00	b66.00		1920		cc	100.0													
6-A	H. H. Wadsworth. (b) (w)	5,000	b62.50	b62.50		1920		100.0														
6-A	H. H. Wadsworth. (b) (w)	57,000	b62.50	b62.50		1920		100.0														
6-B	Waterford Irrigation Dist.	66,950	ec1.50	ec1.50		1918																
6-B	W. F. McClure. (dd)	3,600	ff2.50	ff2.50		1918																

REMARKS—(a) Rpt. to company. (b) Of Los Angeles. (c) Rpt. to Sheldon and Lancaster of Los Angeles. (d) Rpt. to State Engr. (e) The Palmdale Irrigation Dist. succeeded the Palmdale Water Co.; 6,000 is the gross area and 4,400 the net area of dist. (f) Of Berkeley. (g) Concrete lining contemplated. (h) From rpt. to dist. (i) Net acreage. (j) Rpt. to dist. (k) West Mesa. (l) East Mesa. (m) Rpt. of Mojave River Comm. (W. F. McClure, J. A. Sourwine and C. E. Tait) to the Supervisors of San Bernardino County. (n) Includes partial area proposals in k and l. (o) The proportions of these crops should not be large. See note (m). (p) For East Carson River from canal measurements by U. S. R. S. and area measurements by L. H. Taylor. (q) Of Reno, Nevada. (r) From Water Supply of Truckee-Carson Proj., filed with Appl. 493, Div. of W. Rts. (s) Of Portland, Ore. (t) From 20th An. Rpt., U. S. R. S. (u) Season Apr. 1 to Oct. 15, 198 days. (v) From case of Hillsdale Water Co. vs. Wm. A. Trickey before A. E. Chandler, arbitrator, July, 1921. (w) Of San Francisco. (z) These crops to be grown; areas not estimated. (aa) Water to be used: quantity not estimated. (b) Plaintiff's Engineer. (cc) In State Bond Comm. Rpt. on dist. (dd) These proposals omitted from summary of Sec. 6, as they give excessive weight to one locality not wholly typical of the Section. (ee) Rice. (ff) By State Engr. (gg) Of Stockton. (hh) Valley lands. Duty based on alfalfa requirements. (ii) Of Stockton.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area. Acres.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.			Proposed monthly use in per cent of annual supply.														
			Gross Feet.	Net. Feet.			Alfalfa. P. ct.	Trees Vines P. ct.	Grain P. ct.	Misc. P. ct.	Jan. P. ct.	Feb. P. ct.	Mar. P. ct.	Apr. P. ct.	May P. ct.	June P. ct.	July P. ct.	Aug. P. ct.	Sept. P. ct.	Oct. P. ct.	Nov. P. ct.	Dec. P. ct.		
6-E	Lindsay-Strathmore Irrigation Dist. (a)																							
	S. F. Kieffer (b)	13,410	1.90	1.75	8.0	1916			100.0															
6-F	Terra Bella Irrigation Dist.																							
	S. F. Kieffer (b) (d)	10,000	1.65	1.50	10.0	1915			100.0															
	S. E. Kieffer (b) (c)		1.67	1.50	10.2	1921			100.0															
6-F	Lindsay-Strathmore and Terra Bella Irrigation Dist. Areas.																							
	S. E. Kieffer (b)		1.50	1.00	33.3	h			100.0															
7-A	Woodbridge Area, U. S. R. S.																							
	A. N. Burch (i) (j)	51,000		2.25		1918																		
-A	Stockton Area. (k)																							
	S. T. Harding (j) and R. D. Robertson	20,000	2.50			1912																		
7-B	Lowie Tree Irrigation Dist. (c)																							
	A. Kempney (b)	2,167		2.00		1921																		
				1.20																				
7-B	Knightsen Irrigation Dist. (m)																							
	J. B. Brown (n)	8,762	3.50	2.00		1920																		
7-C	West Side Irrigation Dist. (c)																							
	W. G. Hunter (o)	11,500	3.00	2.40	30.0	1915																		
7-C	Byron-Bethany Irrigation Dist.																							
	F. H. Tibbatts (b) (e)	13,090	2.50	2.00	20.0	1920																		
	S. C. Whipple (m) (n)	13,090	2.50	2.00	20.0	1920																		
7-C	Naztec-Burke Irrigation Dist. (m)																							
	S. C. Whipple (n)	3,346	2.50			1920																		
7-C	Kasson Irrigation Dist. (m)																							
	S. C. Whipple (n)	2,107	2.50			1920																		
7-C	Banta-Carbena Irrigation Dist.																							
	S. C. Whipple (m) (n)	18,850	2.50	2.50		1920																		
	J. B. Brown (n) and Dist. Four. (c) (s)	15,000	3.00	2.50	20.0	1922																		
7-D	West Stanislaus Irrigation Dist. (c)																							
	E. N. Bryan (o)	35,681		2.25		1921																		

REMARKS (a) From rpt. to Board Comm. by W. L. Huber. (b) Of San Francisco. (c) Irrigation season 175 days. (d) Prelim. rpt. on dist. (e) From rpt. to dist. (f) Irrigation season from 150 to 200 days. (g) Irrigation season from 180 to 240 days. (h) Est. of use prior to formation of dist. (i) From rpt. on secondary project to Director U. S. R. S. (j) Of Berkeley. (k) From Rpt. of Conservation Comm. of State of California, 1912. (m) From rpt. to State Engr. (n) Of Berkeley. (o) Of Stockton. (p) Irrigation season 175 days. (q) Irrigation season 180 days. (r) Report to State Engr. (s) By J. B. Brown. (t) Of Sacramento. (x) These crops to be grown; areas not estimated. (y) Water to be used; quantity not estimated.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year proposed.	Estimated area of future crops to per cent of total.				Proposed monthly use in per cent of annual supply.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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7-J	California Packing Corp. Owners	Acres. 3,900	Feet. 1 50	Net. 1 50	P. ct.

Continued on next page.

REMARKS—(a) Location T. 7 S., R. 15 E., between Turtle and Plumb, 5 mi. east of Merced. Water pumped from wells. (b) Reported by R. E. Robison to Cope, Rand and Means, San Francisco. (c) Deciduous. (d) From rpt. by Harry Barnes to Daniel Hayes Co. of Chowchilla. (e) Of Madera. (f) Unlined ditches. (g) Based on actual use on Fresno Canal. (h) By engineers of Madera Irrigation Dist. (i) By T. H. Means. (j) From rpt. to J. D. Galloway. (k) Total area 350,000 ac., 20 per cent of gross area considered not irrigated. (l) From 4 to 6 irrigations. (m) From Rpt. of Conservation Comm. of the State of California, 1912. (n) Includes Stockton, West Side San Joaquin Valley, Kings River and Kern River areas. (o) Of Fresno. (p) These crops to be grown; areas not estimated. (q) From rpt. of I. Teilmann. (r) From rpt. of I. Teilmann. (s) Consisting of G. L. Swendsen, Quinton Code and Hill, I. Teilmann, J. B. Lippincott, Max W. Enderlein, A. D. Schindler and W. H. Schafer. (t) From rpt. on slide.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of water in conveyance.	Year of proposal.	Estimated area of future crops to per cent of total.			Proposed monthly use in per cent of annual supply.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			Gross.	Net.			Alfalfa.	Trces. Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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7-S	Continued from page 175 Kings River Conservancy Dist.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

REMARKS—(a) Of San Francisco. (b) In rpt. to dist. (c) Of Los Angeles. (d) Of Fresno. (e) Of Los Angeles. (f) Ideal use on delta lands. (g) From rpt. to State Engr. (h) Concrete lined ditches proposed. (i) Season 5 to 7 months. (j) Barnes rpt. indicates that it is unlikely that there will be sufficient stored water for 1.5 ft. use on 58,000 acres. (m) Rpt. to State Engr. (n) Of Berkeley. (o) Based on 1 sec. ft. to 144 acres. (p) Irrigation season 240 days. (q) From Bull. 9, State Dept. of Eng. (r) From Rpt. of Conservation Comm. of the State of California, 1912. (s) Area irrigated in 1912. (t) Area north of Tulare Lake, extending through Fresno County between the lower valley lands and the edge of the west side foothills. (u) Rpt. to John F. Sullivan, Mgr., Colony Holding Corporation. Land is divided into soil classes on which use varies from 1.5 to 2.5 ft. depth on land. (v) Of Mesa, Ariz. (w) Sugar beets in Santa Maria Valley. (x) These crops to be irrigated; areas not estimated. (y) Computed on a basis of 1 miner's inch to 10 ac. with a 250-day irrigation season.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use in per cent of annual supply.														
							Alfalfa.	Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
			Feet.	Net.	P. ct.	P. ct.																	P. ct.	P. ct.	P. ct.
10-C	Lower Salinas Valley. (a) S. T. Harding (b) and R. D. Robertson	40,000		2.00		1912	z			z															
11-C	Santa Clara Valley in Santa Clara Co. (c) F. H. Tibbets, (d) and S. E. Kieffer. (e) F. H. Tibbets (d) and S. E. Kieffer. (d) F. H. Tibbets (d) and S. E. Kieffer. (d)				1.25 2.00 41.42	1920 1920 1922	100.0			100.0															
12-A	Delta Lands of Sacramento and San Joaquin Rivers. G. S. Nickerson. (f) (g) C. E. Grunsky. (d) (h)	470,000		1.69	2.60 1.53	1922 1921	3.5	6.2	54.2	36.1					8.0	15.0	20.6	21.5	21.0	10.5	2.8				
13-A	Anderson-Cottonwood Irrigation Dist. (j) W. L. Huber. (d) W. L. Huber. (d)	20,000 26,000	5.33	84.00 m3.05	33.3	1917 1917																			
13-B	El Camino Irrigation Dist. (n) S. C. Whipple. S. C. Whipple.			2.50 1.50		1920 1920	100.0																		
13-C	Los Molinos Land Co. (p) W. R. Parkhill. (q)	15,000	3.70	2.40	35.1	1922	34.0	33.0		33.0					8.4	16.7	18.1	22.2	15.1	13.8	5.7				
13-D	Stanford Vina Ranch. Polk and Robinson. (s) (t) Frank D. Robson. (w)	1,711	3.75			1921	21.7			78.3															
13-E	Lands under Iron Canyon Reservoir. (z) H. J. Gault and W. F. McClure. (j)	225,000	5.62	3.70	13.2	1921	xy																		
13-F	Orland Project, U. S. R. S. U. S. R. S. (aa)	21,280	4.12	2.75	33.0	1920								6.0	10.0	14.0	19.0	21.0	19.0	17.0	2.0	2.0			
13-Q	Cordua Irrigation Dist. A. D. Edmonston. (bb) (j)	6,240 4,340	4.40	3.50 2.00	20.0	1921 1920									16.0	17.0	17.0	17.0	17.0	10.0					

REMARKS—(a) From Rpt. of Conservation Comm. of the State of California, 1912. (b) Of Berkeley. (c) Rpt. to Santa Clara Val. Water Conservation Comm., 1921. (d) Of San Francisco. (e) Average use includes 16,281 acres in towns for which use of 1.31 ft. was allowed. (f) Of Sacramento. (g) Verbal. (h) From correspondence, C. E. Grunsky to Paul Bailey, July 13, 1922. (i) Evaporation only. (j) Rpt. of cons. engr. to dist. (k) Max. supply estimated. (l) Season counted on 6½ months. (m) Max. supply estimated, counting on 5½ months season. (n) From rpt. to State Engr. (p) From rpt. to Federal Land Bank of Berkeley. (q) Of Berkeley. (r) On a basis of 2.8 ft. depth on land for alfalfa and miscellaneous crops and 1.6 ft. depth on land for trees and vines. (s) From rpt. to directors of Stanford Vina Ranch. (t) Of Chien. (u) Season 190 days. (v) Of Vina, California. (w) These crops grown; areas not estimated. (x) Major crop. (y) From joint rpt. to State and Iron Canyon Water Assn. (aa) From letter of Mgr. R. C. L. Weber, 1922. (bb) Of Palo Alto. (cc) Rpt. to State Engr. (dd) Rice.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth of land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use, in per cent of annual supply.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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REMARKS—(a) From Rpt. of Conservation Comm. of the State of California, 1912. (b) Of Berkeley. (c) Counting on reservoir water for Aug. and Sept. only. (d) Counting on reservoir water for July, Aug. and Sept. (e) Of Sacramento. (f) From rpt. to State Engr. (g) From rpt. to State Engr. (h) Month of max. use. (i) Irrig. dist. engr. s. rpt. (j) Of Colusa. (k) Based on power required for pumping in 1913, 1914, and 1915 by Sac. Val. W. Side Canal Co. (l) Est. on a basis of 7.0 ft. depth on land for rice and 2.5 ft. depth on land for miscellaneous crops. (m) Rice, 23 per cent of total crops. (n) Based on power required for pumping during 1913 and 1914. (o) From rpt. on dist. (p) From rpt. on further development of Gleam-Colusa Irrigation Dist. (q) Of San Francisco. (r) Estimated on a basis of 5.0 ft. depth on land for rice, 2.5 ft. depth on land for miscellaneous crops, and 1.5 ft. depth on land for trees and vines. (s) Rice, 30.9 per cent of total crops. (t) Taken from curve prepared by Tibbetts. (u) From rpt. on Sac. Val. W. Side Canal. (v) Rice, 59 per cent of total crops. (w) Major crop is rice. (x) Water to be used; quantity not estimated. (y) From 7th Bien. Rpt., State Engr. and Bull. 325, Univ. of Calif., Agr. Exp. Sta., for clay adobe soils. (z) Rice. (bb) From rpt. to Yolo Water and Power Co. on Little Indian Valley Reservoir. (cc) Gross area. (dd) Computed for net acreage from Grunsky's rpt. to Yolo Water and Power Co. (ee) From rpt. on the development of Clear Lake Reservoir.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area. Acres.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year proposed.	Estimated area of future crops in per cent of total.				Proposed monthly use, in per cent of annual supply.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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REMARKS.—(a) From Rpt. of Conservation Comm. of the State of California, 1912. (b) Of Berkeley. (c) This figure presupposes a storage of 200,000 ac. ft. in Clear Lake and 50,000 ac. ft. in Little Indian Valley. (d) Rpt. to assn. (e) Of San Francisco. (f) Major crop. (g) Rpt. to dist. (h) From data of late D. B. Macoun, Supt. (i) Old citrus orchards, 1.8 ft. depth on land. Young citrus orchards 2.7 ft. depth on land. (j) Irrigation season 225 days. (k) From rpt. on dist. (l) With Columbia Basin Survey Comm., Olympia, Wash. (m) From rpt. on dist. (n) From rpt. to State Water Comm. by Supt. Edwards, Paradise, Calif. (o) Irrigation season 150 days. (p) Of Oroville. (q) Irrigation season 150 days. (r) Irrigation season 150 days. (s) Of Oroville. (t) These crops to be grown; areas not estimated. (u) Based on 2.5 ft. depth on land for alfalfa and 1.5 ft. depth on land for trees and vines. (v) From Irng. Inv. rpt. (w) Of Berkeley. (x) Water to be used; quantity not estimated. (y) These crops to be grown; areas not estimated. (z) Based on 2.5 ft. depth on land for alfalfa and 1.5 ft. depth on land for trees and vines.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use, in per cent of annual supply.													
			Gross.	Net.			Alfalfa.	Trees Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
14-Q	Diamond Ridge Water Co. Jones, Reddick and Holley. (a) (b)	Acres. 45,000	Feet. 1.50	Feet. 1.50	P. ct. 1915																			
14-Q	N. B. Ellery. (b) (c) H. Parker Farm. (y)	30,000	1.50	1.00	33.0	1919																		
14-S	J. E. Barreau (d) Citrus Heights Irrigation Dist.			1.00		1920																		
14-S	S. C. Whipple. (f) J. W. Gross. (h) (i)	3,970 2,461	1.50	1.50		1920 1921																		
14-S	North Fork Ditch Co. (f) S. E. Kieffer. (b)	36,600	1.75	1.66	ks. 0	1920																		
14-S	Carmichael Irrigation Dist. (h) A. Givan. (i)			1.50		1916																		
14-T	Fair Oaks Irrigation Dist. J. J. Jessup. (j) (l)	5,000	1.60			1918																		
14-U	S. E. Kieffer. (b) (h) Upper Miners Ravine. (y) M. J. Gillman (b) and Geo. S. Nickerson. (i)	5,000	2.00																					
14-U	Lower Miners Ravine. (n) S. E. Kieffer. (b)		1.75	1.66																				
14-U	Rock and Walker Creeks. (a) Noble and Davidson. (p)			0.64																				
14-V	Michigan Bar Area. (q) E. R. Walker		2.00																					
15-A	Round Valley Indian Reservation. L. M. Holt. (r)		2.40	1.75	27.0	1917																		

REMARKS—(a) From rpt. to O. Scribner on irrigation from Slate Creek. (b) Of San Francisco. (c) From rpt. on company to Frank Adams, Feb. 22, 1919. (d) Of Auburn. (f) From rpt. to State Engr. (g) Major crops. (h) From rpt. to dist. (i) Of Sacramento. (j) From consulting engs. rpt. to dist. (k) Assuming concrete lined canals. (l) Of Berkeley. (m) Irrigation season 200 days. (n) From rpt. on North Fork Ditch Co. (o) From rpt. on municipal water supply project for City of San Francisco. (p) Of Berkeley. (q) Irrigates south and east of Cosumnes River below Michigan Bar. (r) Supervising Engr., U. S. Indian Service, Yakima, Wash. (s) Water to be used; quantity not estimated. (t) From State Dept. of Pub. Wks., Div. of Eng. and Irrig. files.

TABLE 9.

TABLE 9—(Continued). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.				Proposed monthly use, in per cent of annual supply.												
			Gross.	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
16-A	Klamath Project, U. S. R. S.	Acres.	Feet.	Feet.	P. ct.	1921	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
16-A	20th An. Rpt. U. S. R. S.	140,880	.....	1.80	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-A	Klamath River Lands. (b)	200,000	3 00	.....	.....	1922	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-C	E. C. La Rue. (c)	4,064	.....	2.00	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-C	Grenada Irrigation Dist.	.....	.....	.....	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-C	F. H. Tibbets. (d) (e)	.....	.....	.....	.....	1922	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-C	Lands in Shasta Valley. (b)	100,000	2 50	.....	.....	1922	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-E	E. C. La Rue. (c)	.....	.....	.....	.....	1922	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-E	North Central Mountain Valleys. (f)	250,000	1 50	.....	.....	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-F	Frank Adams. (g)	.....	.....	.....	.....	1912	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-F	Shasta County Valleys Tributary to Pit River. (h)	.....	.....	.....	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-G	E. G. Hopson (j) and O. W. Peterson (e)	111,000	2 50	.....	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-G	Big Valley Area.	.....	.....	.....	.....	1921	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-H	A. Babcock. (i)	200	2 67	.....	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-H	Modoc and Lassen County Valleys tributary to Pit River. (h)	.....	.....	.....	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-K	E. G. Hopson (j) and O. W. Peterson (e)	66,000	.....	2.00	.....	1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-K	Crooks Canyon Irrigation Dist. (k)	.....	.....	.....	.....	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-M	H. H. Blee. (l)	6,080	1 00	.....	.....	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-M	Surprise Valley Irrigation Dist. (d)	.....	.....	.....	.....	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-O	W. L. Wales. (n) (o)	17,500	2 00	1.50	25.0	1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-O	Secret Valley Irrigation Dist. (d)	.....	.....	.....	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-Q	W. L. Wales. (n)	8,000	.....	1.25	.....	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-Q	Tule Irrigation District. (p)	.....	.....	.....	.....	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-Q	E. L. Cope. (q)	60,000	2 00	.....	.....	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-Q	Honey Lake Valley Irrigation Dist. (d)	.....	.....	.....	.....	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16-Q	W. L. Wales. (n)	33,150	2 20	1.83	16.8	1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

REMARKS:—(a) Apr. 15 to Sept. 30, 1918 days. (b) From Klamath River and its utilization, 1922, Water Resources Branch, U. S. G. S. (c) Of Pasadena. (d) From rpt. to dist. (e) Of San Francisco. (f) From Rpt. of Conservation Comm., State of California, 1912. (g) Of Berkeley. (h) From U. S. R. S. rpt. on Pit River Basin. (i) Irrigation season 120 days. (j) Of Portland. (k) From rpt. to State Engr. by Hydrographer Blee. (l) Of Bieber, Calif. (m) Irrigation season 90 days. (n) Of Woodland. (o) Wade's estimate in 1918 gives irrigable area as 21,400 ac. (p) Estimate. (q) Of Cope, Band and Means, San Francisco. (r) These crops to be grown; areas not estimated. (s) Water to be used; quantity not estimated. (t) Estimate. (u) Estimate. (v) Estimate. (w) Estimate. (x) Estimate. (y) Estimate. (z) Estimate. (aa) Estimate. (ab) Estimate. (ac) Estimate. (ad) Estimate. (ae) Estimate. (af) Estimate. (ag) Estimate. (ah) Estimate. (ai) Estimate. (aj) Estimate. (ak) Estimate. (al) Estimate. (am) Estimate. 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(pv) Estimate. (pw) Estimate. (px) Estimate. (py) Estimate. (pz) Estimate. (qa) Estimate. (qb) Estimate. (qc) Estimate. (qd) Estimate. (qe) Estimate. (qf) Estimate. (qg) Estimate. (qh) Estimate. (qi) Estimate. (qj) Estimate. (qk) Estimate. (ql) Estimate. (qm) Estimate. (qn) Estimate. (qo) Estimate. (qp) Estimate. (qq) Estimate. (qr) Estimate. (qs) Estimate. (qt) Estimate. (qu) Estimate. (qv) Estimate. (qw) Estimate. (qx) Estimate. (qy) Estimate. (qz) Estimate. (ra) Estimate. (rb) Estimate. (rc) Estimate. (rd) Estimate. (re) Estimate. (rf) Estimate. (rg) Estimate. (rh) Estimate. (ri) Estimate. (rj) Estimate. (rk) Estimate. (rl) Estimate. (rm) Estimate. (rn) Estimate. (ro) Estimate. (rp) Estimate. (rq) Estimate. (rr) Estimate. (rs) Estimate. (rt) Estimate. (ru) Estimate. (rv) Estimate. (rw) Estimate. (rx) Estimate. (ry) Estimate. (rz) Estimate. (sa) Estimate. (sb) Estimate. (sc) Estimate. (sd) Estimate. (se) Estimate. (sf) Estimate. (sg) Estimate. (sh) Estimate. (si) Estimate. (sj) Estimate. (sk) Estimate. (sl) Estimate. (sm) Estimate. (sn) Estimate. (so) Estimate. (sp) Estimate. (sq) Estimate. (sr) Estimate. (ss) Estimate. (st) Estimate. (su) Estimate. (sv) Estimate. (sw) Estimate. (sx) Estimate. (sy) Estimate. (sz) Estimate. (ta) Estimate. (tb) Estimate. (tc) Estimate. (td) Estimate. (te) Estimate. (tf) Estimate. (tg) Estimate. (th) Estimate. (ti) Estimate. (tj) Estimate. (tk) Estimate. (tl) Estimate. (tm) Estimate. (tn) Estimate. (to) Estimate. (tp) Estimate. (tq) Estimate. (tr) Estimate. (ts) Estimate. (tu) Estimate. (tv) Estimate. (tw) Estimate. (tx) Estimate. (ty) Estimate. (tz) Estimate. (ua) Estimate. (ub) Estimate. (uc) Estimate. (ud) Estimate. (ue) Estimate. (uf) Estimate. (ug) Estimate. (uh) Estimate. (ui) Estimate. (uj) Estimate. (uk) Estimate. (ul) Estimate. (um) Estimate. (un) Estimate. (uo) Estimate. (up) Estimate. (uq) Estimate. (ur) Estimate. (us) Estimate. (ut) Estimate. (uu) Estimate. (uv) Estimate. (uw) Estimate. (ux) Estimate. (uy) Estimate. (uz) Estimate. (va) Estimate. (vb) Estimate. (vc) Estimate. (vd) Estimate. (ve) Estimate. (vf) Estimate. (vg) Estimate. (vh) Estimate. (vi) Estimate. (vj) Estimate. (vk) Estimate. (vl) Estimate. (vm) Estimate. (vn) Estimate. (vo) Estimate. (vp) Estimate. (vq) Estimate. (vr) Estimate. (vs) Estimate. (vt) Estimate. (vu) Estimate. (vv) Estimate. (vw) Estimate. (vx) Estimate. (vy) Estimate. (vz) Estimate. (wa) Estimate. (wb) Estimate. (wc) Estimate. (wd) Estimate. (we) Estimate. (wf) Estimate. (wg) Estimate. (wh) Estimate. (wi) Estimate. (wj) Estimate. (wk) Estimate. (wl) Estimate. (wm) Estimate. (wn) Estimate. (wo) Estimate. (wp) Estimate. (wq) Estimate. (wr) Estimate. (ws) Estimate. (wt) Estimate. (wu) Estimate. (wv) Estimate. (ww) Estimate. (wx) Estimate. (wy) Estimate. (wz) Estimate. (xa) Estimate. (xb) Estimate. (xc) Estimate. (xd) Estimate. (xe) Estimate. (xf) Estimate. (xg) Estimate. (xh) Estimate. (xi) Estimate. (xj) Estimate. (xk) Estimate. (xl) Estimate. (xm) Estimate. (xn) Estimate. (xo) Estimate. (xp) Estimate. (xq) Estimate. (xr) Estimate. (xs) Estimate. (xt) Estimate. (xu) Estimate. (xv) Estimate. (xw) Estimate. (xx) Estimate. (xy) Estimate. (xz) Estimate. (ya) Estimate. (yb) Estimate. (yc) Estimate. (yd) Estimate. (ye) Estimate. (yf) Estimate. (yg) Estimate. (yh) Estimate. (yi) Estimate. (yj) Estimate. (yk) Estimate. (yl) Estimate. (ym) Estimate. (yn) Estimate. (yo) Estimate. (yp) Estimate. (yq) Estimate. (yr) Estimate. (ys) Estimate. (yt) Estimate. (yu) Estimate. (yv) Estimate. (yw) Estimate. (yx) Estimate. (yy) Estimate. (yz) Estimate. (za) Estimate. (zb) Estimate. (zc) Estimate. (zd) Estimate. (ze) Estimate. (zf) Estimate. (zg) Estimate. (zh) Estimate. (zi) Estimate. (zj) Estimate. (zk) Estimate. (zl) Estimate. (zm) Estimate. (zn) Estimate. (zo) Estimate. (zp) Estimate. (zq) Estimate. (zr) Estimate. (zs) Estimate. (zt) Estimate. (zu) Estimate. (zv) Estimate. (zw) Estimate. (zx) Estimate. (zy) Estimate. (zz) Estimate.

TABLE 9.

TABLE 9—(Concluded). USE OF WATER AS PROPOSED FOR VARIOUS LOCALITIES.

Section and key letter.	Locality. Duty proposed by:	Area.	Annual use in depth on land.		Estimated loss of diverted water in conveyance.	Year of proposal.	Estimated area of future crops in per cent of total.					Proposed monthly use, in per cent of annual supply.												
			Gross	Net.			Alfalfa.	Trees, Vines.	Grain.	Misc.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
16-Q	Honey Lake Valley.	Acrea.			P. ct.		P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.	P. et.
	U. S. R. S. (a)			2.00		1912																		
	Frank Adams. (b) (c)	117,500		41.50		1912																		
	Frank Adams. (b) (c)	117,500		42.00																				
16-R	Long Valley Creek Irrigation Dist. (f)																							
16-R	E. C. Eaton (g)		2.00	1.50	25.0	1922																		
	Southern Lassen Irrigation Dist. (h)																							
	W. L. Wales (i)	22,565	2.50	2.00	20.0	1917									y	y	y	y	y	y	y	y	y	y

REMARKS—(a) From rpt. by U. S. R. S., Aug. 9, 1915. (b) From Rpt. of Conservation Comm. of the State of California, 1912. (c) Of Berkeley. (d) Without storage. (e) With storage. (f) To State Engr. (g) Of Sacramento. (h) From rpt. to dist. (i) Of Woodland. (j) Water to be used; quantities not estimated.

REMARKS—(a) From rpt. by U. S. R. S., Aug. 9, 1915. (b) From Rpt. of Conservation Comm. of the State of California, 1912. (c) Of Berkeley. (d) Without storage. (e) With storage. (f) Rpt. to State Engr. (g) Of Sacramento. (h) From rpt. to dist. (i) Of Woodland. (j) Water to be used; quantities not estimated.

TABLE 10.

TABLE 10—(Continued). SUMMARY OF USE AND DUTY OF WATER

by the sixteen sections of the State.*

Includes average measured and proposed use, annual and monthly†; also the annual duty and desirable monthly use. Summarizes Tables 1, 2, 8 and 9.

Gross annual use and duty.				Net annual use and duty.			Section.	Use and duty.		Monthly use.											
Items in record. ^a	Aggregate area, ^b	Average depth on land	Feet	Items in record. ^a	Aggregate area, ^b	Average depth on land				Average monthly use in per cent of the annual use.											
Number	Acres	Feet		Number	Acres	Feet	Number			Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
23	477,591	6.58	3.31	14	424,597	3.31	5	Measured use.				2.0	13.0	19.0	19.0	19.7	14.1	9.8	2.5	0.3	
3		3.82	2.67	3		2.67		Proposed use.					10.0	14.0	21.0	21.0	18.0	16.0			
			2.50			2.50		Duty. | Desirable use.				2.0	10.0	16.0	20.0	20.0	18.0	10.0	4.0		
22	124,317	4.36	1.55	12	47,406	1.55	6	Measured use.			0.2	0.5	1.4	9.1	18.0	20.4	17.5	14.0	11.2	5.7	1.0
4		1.68	1.61	7		1.61		Proposed use.													0.1
			1.75			1.75		Duty. | Desirable use.													
200	10,314,890	2.66	2.21	120	2,751,012	2.21	7	Measured use.				1.0	3.0	10.0	10.0	18.0	16.0	11.0	6.0	1.0	
41		2.59	2.17	46		2.17		Proposed use.				2.5	7.4	16.1	23.7	22.1	13.5	5.6	2.5	2.2	1.5
			2.00			2.00		Duty. | Desirable use.				1.2	5.7	11.7	16.4	18.7	16.7	12.9	10.5	3.6	2.1
												2.0	5.0	11.0	17.0	18.0	15.0	10.0	4.0		
			1.14	4	3,325	1.14	8	Measured use.				4.3	5.7	7.1	7.0	12.5	11.6	7.7	8.0	13.0	5.6
1		2.50						Proposed use.													
			1.75			1.75		Duty. | Desirable use.													
												2.0	5.0	11.0	17.0	18.0	15.0	10.0	4.0		

* See page 26 and map, Plate V.

† Average measured use is computed, weighting each use by the area it represents.

(a) An item in the records consists of: for measured use, the data for one year; for proposed use, one proposal for future practice.

(b) Aggregate area is the summation of acreage for all years of record and for all systems listed in this section; includes any repetition of the same acreage for ensuing years.

TABLE 10.

TABLE 10—(Continued.) SUMMARY OF USE AND DUTY OF WATER

by the sixteen sections of the State.*

Includes average measured and proposed use, annual and monthly †; also the annual duty and desirable monthly use. Summarizes Tables 1, 2, 8 and 9.

Gross annual use and duty.				Net annual use and duty.				Section.	Use and duty.	Average monthly use in per cent of the annual use.													
Items in record <i>a</i>	Aggregate area. <i>b</i>	Average depth on land.	Feet	Items in record <i>a</i>	Aggregate area. <i>b</i>	Average depth on land.	Feet			Items in record <i>a</i>	Aggregate area. <i>b</i>	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Number	Acres	Feet	Number	Acres	Feet	Number	Number	Acres	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	
	4	8,153	2.96	5	8,453	2.43	9	Measured use.															
				3		1.32		Proposed use.															
						1.50		Duty. | Desirable use.		2.0	2.0	2.0	5.0	12.0	16.0	20.0	16.0	13.0	8.0	2.0	2.0		
	1		2.00	5	5,788	1.82	10	Measured use.															
								Proposed use.															
								Duty. | Desirable use.					2.0	12.0	18.0	20.0	20.0	16.0	10.0	2.0			
	7	6,692	2.08	9	14,398	1.42	11	Measured use.		1.4	1.7	1.8	2.3	7.7	17.0	18.9	16.3	14.0	8.5	5.9	4.5		
				1		1.42		Proposed use.															
						1.50		Duty. | Desirable use.					4.0	6.0	15.0	20.0	15.0	15.0	14.0	9.0	2.0		
				1	470,000	1.14	12	Measured use.				1.6	1.8	6.0	22.3	25.1	21.9	14.9	4.5	1.9			
	1		1.69	2		1.76		Proposed use.															
						1.50		Duty. | Desirable use.															

REMARKS: * See page 26 and map, Plate V.

† Average measured use is computed, weighting each use by the area it represents.

(a) An item in the records consists of: for measured use, the data for one year; for proposed use, one proposal for future practice.

(b) Aggregate area is the summation of acreage for all years of record and for all systems listed in this section; includes any repetition of the same acreage for ensuing years.

TABLE 10.

TABLE 10—(Concluded). SUMMARY OF USE AND DUTY OF WATER

by the sixteen sections of the State.*

Includes average measured and proposed use, annual and monthly †; also the annual duty and desirable monthly use. Summarizes Tables 1, 2, 8 and 9.

Gross annual use and duty.				Net annual use and duty.				Section.	Use and duty.		Monthly use.											
Items in record ^a	Aggregate area, b	Average depth on land	Feet	Items in record ^a	Aggregate area, b	Average depth on land	Feet				Average monthly use in per cent of the annual use.											
Number	Acres	Feet		Number	Acres	Feet		Number	Measured use.	Proposed use.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
106	1,410,399	6.32	3.88	83	637,538	3.88		13														
22		4.10	2.99	23		2.99																
			2.25			2.25																
10	45,214	3.65	1.47	42	187,217	1.47		14														
18		2.32	1.66	36		1.66																
			1.50			1.50																
3	1,541	2.62	1.52	3	1,541	1.52		15														
1		2.40	1.75	1		1.75																
			1.25			1.25																
24	403,712	2.34	1.30	26	437,206	1.30		16														
9		2.08	1.89	13		1.89																
			1.75			1.75																

* See page 26 and map, Plate V.

† Average measured use is computed, weighting each use by the area it represents.

(a) An item in the records consists of: for measured use, the data for one year; for proposed use, one proposal for future practice.

(b) Aggregate area is the summation of acreage for all years of record and for all systems listed in this section; includes any repetition of the same acreage for ensuing years.

TABLE 11.

TABLE 11. ILLUSTRATIVE CLIMATOLOGICAL DATA FOR AGRICULTURAL LANDS

by the sixteen sections of the State*.

Data from U. S. Weather Bureau records for selected stations within the agricultural areas of each section.*

TEMPERATURE: Monthly and annual means.												PRECIPITATION: Monthly and annual means.											
Frost free period.						U. S. Weather Bureau Stations.						Elevation.						Ja.					
Av. a	Days	Ab. b	Days	Annual	Deg.	De.	Nv.	Oc.	Nov.	Dec.	Annual	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Section.												No.											
1												2											
52	83	233	66	038	62	1	63	54	61	4	30	1	63	336	2	86	0	73	0	34	0	07	0
53	67	060	165	049	4	73	1	76	27	3	38	1	066	2	113	46	3	01	1	75	0	38	17
54	83	155	47	830	2	62	966	464	862	3	54	6	119	3	54	3	04	51	0	34	0	32	0
55	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
56	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
57	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
58	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
59	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
60	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
61	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
62	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
63	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
64	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
65	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
66	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
67	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
68	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
69	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
70	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
71	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
72	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
73	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
74	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
75	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
76	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
77	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
78	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
79	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
80	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
81	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
82	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
83	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
84	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
85	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
86	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
87	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
88	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
89	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
90	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
91	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
92	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
93	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
94	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
95	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
96	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
97	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
98	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
99	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63
100	258	51	372	569	4	75	179	073	966	3	61	4	95	2	78	1	41	53	06	0	00	0	63

REMARKS.—* See page 26 and map, Plate V. (a) Av.—Average number of days free from killing frosts for all years of record; (b) Ab.—Absolute number of days between latest recorded spring frost and earliest recorded fall frost, for all years of record; these frosts not necessarily occurring in same year. (c) Stations with annual record nearest this section.

TABLE 11.

TABLE 11—(Continued). ILLUSTRATIVE CLIMATOLOGICAL DATA FOR AGRICULTURAL LANDS

by the sixteen sections of the State. *
Data from U. S. Weather Bureau records for selected stations within the agricultural areas of each section. *

TEMPERATURE: Monthly and annual means.												PRECIPITATION: Monthly and annual means.														
Frost. free period.												U. S. Weather Bureau Stations.	Section.	Elevation.	Monthly and annual means.											
Jan.		Feb.		Mar.		Apr.		May.		June.					July.		Aug.		Sept.		Oct.		Nov.		Dec.		Annual.
Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.
Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.
Av. a.	Ab. b.																									
Days.	Days.																									
Annual.	Degrees.																									
7.5	21.2	7.3	20.8	8.4	23.2	8.5	23.8	9.0	24.2	9.3	24.6	9.6	24.9	9.9	25.2	10.2	25.5	10.5	25.8	10.8	26.1	11.1	26.4	11.4	26.7	11.7
7.6	21.3	7.4	20.9	8.5	23.3	8.6	23.9	9.1	24.3	9.4	24.7	9.7	25.0	10.0	25.3	10.3	25.6	10.6	25.9	10.9	26.2	11.2	26.5	11.5	26.8	11.8
7.7	21.4	7.5	21.0	8.6	23.4	8.7	24.0	9.2	24.4	9.5	24.8	9.8	25.1	10.1	25.4	10.4	25.7	10.7	26.0	11.0	26.3	11.3	26.6	11.6	26.9	11.9
7.8	21.5	7.6	21.1	8.7	23.5	8.8	24.1	9.3	24.5	9.6	24.9	9.9	25.2	10.2	25.5	10.5	25.8	10.8	26.1	11.1	26.4	11.4	26.7	11.7	27.0	12.0
7.9	21.6	7.7	21.2	8.8	23.6	8.9	24.2	9.4	24.6	9.7	25.0	10.0	25.3	10.3	25.6	10.6	25.9	10.9	26.2	11.2	26.5	11.5	26.8	11.8	27.1	12.1
8.0	21.7	7.8	21.3	8.9	23.7	9.0	24.3	9.5	24.7	9.8	25.1	10.1	25.4	10.4	25.7	10.7	26.0	11.0	26.3	11.3	26.6	11.6	26.9	11.9	27.2	12.2
8.1	21.8	7.9	21.4	9.0	23.8	9.1	24.4	9.6	24.8	9.9	25.2	10.2	25.5	10.5	25.8	10.8	26.1	11.1	26.4	11.4	26.7	11.7	27.0	12.0	27.3	12.3
8.2	21.9	8.0	21.5	9.1	23.9	9.2	24.5	9.7	24.9	10.0	25.3	10.3	25.6	10.6	25.9	10.9	26.2	11.2	26.5	11.5	26.8	11.8	27.1	12.1	27.4	12.4
8.3	22.0	8.1	21.6	9.2	24.0	9.3	24.6	9.8	25.0	10.1	25.4	10.4	25.7	10.7	26.0	11.0	26.3	11.3	26.6	11.6	26.9	11.9	27.2	12.2	27.5	12.5
8.4	22.1	8.2	21.7	9.3	24.1	9.4	24.7	9.9	25.1	10.2	25.5	10.5	25.8	10.8	26.1	11.1	26.4	11.4	26.7	11.7	27.0	12.0	27.3	12.3	27.6	12.6
8.5	22.2	8.3	21.8	9.4	24.2	9.5	24.8	10.0	25.2	10.3	25.6	10.6	25.9	10.9	26.2	11.2	26.5	11.5	26.8	11.8	27.1	12.1	27.4	12.4	27.7	12.7
8.6	22.3	8.4	21.9	9.5	24.3	9.6	24.9	10.1	25.3	10.4	25.7	10.7	26.0	11.0	26.3	11.3	26.6	11.6	26.9	11.9	27.2	12.2	27.5	12.5	27.8	12.8
8.7	22.4	8.5	22.0	9.6	24.4	9.7	25.0	10.2	25.4	10.5	25.8	10.8	26.1	11.1	26.4	11.4	26.7	11.7	27.0	12.0	27.3	12.3	27.6	12.6	27.9	12.9
8.8	22.5	8.6	22.1	9.7	24.5	9.8	25.1	10.3	25.5	10.6	25.9	10.9	26.2	11.2	26.5	11.5	26.8	11.8	27.1	12.1	27.4	12.4	27.7	12.7	28.0	13.0
8.9	22.6	8.7	22.2	9.8	24.6	9.9	25.2	10.4	25.6	10.7	26.0	11.0	26.3	11.3	26.6	11.6	26.9	11.9	27.2	12.2	27.5	12.5	27.8	12.8	28.1	13.1
9.0	22.7	8.8	22.3	9.9	24.7	10.0	25.3	10.5	25.7	10.8	26.1	11.1	26.4	11.4	26.7	11.7	27.0	12.0	27.3	12.3	27.6	12.6	27.9	12.9	28.2	13.2
9.1	22.8	8.9	22.4	10.0	24.8	10.1	25.4	10.6	25.8	10.9	26.2	11.2	26.5	11.5	26.8	11.8	27.1	12.1	27.4	12.4	27.7	12.7	28.0	13.0	28.3	13.3
9.2	22.9	9.0	22.5	10.1	24.9	10.2	25.5	10.7	25.9	11.0	26.3	11.3	26.6	11.6	26.9	11.9	27.2	12.2	27.5	12.5	27.8	12.8	28.1	13.1	28.4	13.4
9.3	23.0	9.1	22.6	10.2	25.0	10.3	25.6	10.8	26.0	11.1	26.4	11.4	26.7	11.7	27.0	12.0	27.3	12.3	27.6	12.6	27.9	12.9	28.2	13.2	28.5	13.5
9.4	23.1	9.2	22.7	10.3	25.1	10.4	25.7	10.9	26.1	11.2	26.5	11.5	26.8	11.8	27.1	12.1	27.4	12.4	27.7	12.7	28.0	13.0	28.3	13.3	28.6	13.6
9.5	23.2	9.3	22.8	10.4	25.2	10.5	25.8	11.0	26.2	11.3	26.6	11.6	26.9	11.9	27.2	12.2	27.5	12.5	27.8	12.8	28.1	13.1	28.4	13.4	28.7	13.7
9.6	23.3	9.4	22.9	10.5	25.3	10.6	25.9	11.1	26.3	11.4	26.7	11.7	27.0	12.0	27.3	12.3	27.6	12.6	27.9	12.9	28.2	13.2	28.5	13.5	28.8	13.8
9.7	23.4	9.5	23.0	10.6	25.4	10.7	26.0	11.2	26.4	11.5	26.8	11.8	27.1	12.1	27.4	12.4	27.7	12.7	28.0	13.0	28.3	13.3	28.6	13.6	28.9	13.9
9.8	23.5	9.6	23.1	10.7	25.5	10.8	26.1	11.3	26.5	11.6	26.9	11.9	27.2	12.2	27.5	12.5	27.8	12.8	28.1	13.1	28.4	13.4	28.7	13.7	29.0	14.0
9.9	23.6	9.7	23.2	10.8	25.6	10.9	26.2	11.4	26.6	11.7	27.0	12.0	27.3	12.3	27.6	12.6	27.9	12.9	28.2	13.2	28.5	13.5	28.8	13.8	29.1	14.1
10.0	23.7	9.8	23.3	10.9	25.7	11.0	26.3	11.5	26.7	11.8	27.1	12.1	27.4	12.4	27.7	12.7	28.0	13.0	28.3	13.3	28.6	13.6	28.9	13.9	29.2	14.2
10.1	23.8	9.9	23.4	11.0	25.8	11.1	26.4	11.6	26.8	11.9	27.2	12.2	27.5	12.5	27.8	12.8	28.1	13.1	28.4	13.4	28.7	13.7	29.0	14.0	29.3	14.3
10.2	23.9	10.0	23.5	11.1	25.9	11.2	26.5	11.7	26.9	12.0	27.3	12.3	27.6	12.6	27.9	12.9	28.2	13.2	28.5	13.5	28.8	13.8	29.1	14.1	29.4	14.4
10.3	24.0	10.1	23.6	11.2	26.0	11.3	26.6	11.8	27.0	12.1	27.4	12.4	27.7	12.7	28.0	13.0	28.3	13.3	28.6	13.6	28.9	13.9	29.2	14.2	29.5	14.5
10.4	24.1	10.2	23.7	11.3	26.1	11.4	26.7	11.9	27.1	12.2	27.5	12.5	27.8	12.8	28.1	13.1	28.4	13.4	28.7	13.7	29.0	14.0	29.3	14.3	29.6	14.6
10.5	24.2	10.3	23.8	11.4	26.2	11.5	26.8	12.0	27.2	12.3	27.6	12.6	27.9	12.9	28.2	13.2	28.5	13.5	28.8	13.8	29.1	14.1	29.4	14.4	29.7	14.7
10.6	24.3	10.4	23.9	11.5	26.3	11.6	26.9	12.1	27.3	12.4	27.7	12.7	28.0	13.0	28.3	13.3	28.6	13.6	28.9	13.9	29.2	14.2	29.5	14.5	29.8	14.8
10.7	24.4	10.5	24.0	11.6	26.4	11.7	27.0	12.2	27.4	12.5	27.8	12.8	28.1	13.1	28.4	13.4	28.7	13.7	29.0	14.0	29.3	14.3	29.6	14.6	29.9	14.9
10.8	24.5	10.6	24.1	11.7	26.5	11.8	27.1	12.3	27.5	12.6	27.9	12.9	28.2	13.2	28.5	13.5	28.8	13.8	29.1	14.1	29.4	14.4	29.7	14.7	30.0	15.0
10.9	24.6	10.7	24.2	11.8	26.6	11.9	27.2	12.4	27.6	12.7	28.0	13.0	28.3	13.3	28.6	13.6	28.9	13.9	29.2	14.2	29.5	14.5	29.8	14.8	30.1	15.1
11.0	24.7	10.8	24.3	11.9	26.7	12.0	27.3	12.5	27.7	12.8	28.1	13.1	28.4	13.4	28.7	13.7	29.0	14.0	29.3	14.3	29.6	14.6	29.9	14.9	30.2	15.2
11.1	24.8	10.9	24.4	12.0	26.8	12.1	27.4	12.6	27.8	12.9	28.2	13.2	28.5	13.5	28.8	13.8	29.1	14.1	29.4	14.4	29.7	14.7	30.0	15.0	30.3	15.3
11.2	24.9	11.0	24.5	12.1	26.9	12.2	27.5	12.7	27.9	13.0	28.3	13.3	28.6	13.6	28.9	13.9	29.2	14.2	29.5	14.5	29.8	14.8	30.1	15.1	30.4	15.4
11.3	25.0	11.1	24.6	12.2	27.0	12.3	27.6	12.8	28.0	13.1	28.4	13.4	28.7	13.7	29.0	14.0	29.3	14.3	29.6	14.6	29.9	14.9	30.2	15.2	30.5	15.5
11.4	25.1	11.2	24.7	12.3	27.1	12.4	27.7	12.9	28.1	13.2	28.5	13.5	28.8	13.8	29.1	14.1	29.4	14.4	29.7	14.7	30.0	15.0	30.3	15.3	30.6	15.6
11.5	25.2	11.3	24.8	12.4	27.2	12.5	27.8	13.0	28.2	13.3	28.6	13.6	28.9	13.9	29.2	14.2	29.5	14.5	29.8	14.8	30.1	15.1	30.4	15.4	30.7	15.7
11.6	25.3	11.4	24.9	12.5	27.3	12.6	27.9	13.1	28.3	13.4	28.7	13.7	29.0	14.0	29.3	14.3	29.6	14.6	29.9	14.9	30.2	15.2	30.5	15.5	30.8	15.8
11.7	25.4	11.5	25.0	12.6	27.4	12.7	28.0	13.2	28.4	13.5	28.8	13.8	29.1	14.1	29.4	14.4	29.7	14.7	30.0	15.0	30.3	15.3	30.6	15.6	30.9	15.9
11.8	25.5	11.6	25.1	12.7	27.5	12.8	28.1	13.3	28.5	13.6	28.9	13.9	29.2	14.2	29.5	14.5	29.8	14.8	30.1	15.1	30.4	15.4	30.7	15.7	31.0	16.0
11.9	25.6	11.7	25.2	12.8	27.6	12.9	28.2	13.4	28.6	13.7	29.0	14.0	29.3	14.3	29.6	14.6	29.9	14.9	30.2	15.2	30.5	15.5	30.8	15.8	31.1	16.1
12.0	25.7	11.8	25.3	12.9	27.7	13.0	28.3	13.5	28.7	13.8	29.1	14.1	29.4	14.4	29.7	14.7	30.0	15.0	30.3	15.3	30.6	15.6	30.9	15.9	31.2	16.2
12.1	25.8	11.9	25.4	13.0	27.8	13.1	28.4	13.6	28.8	13.9	29.2	14.2	29.5	14.5	29.8	14.8	30.1	15.1	30.4	15.4	30.7	15.7	31.0	16.0	31.3	16.3
12.2	25.9	12.0	25.5	13.1	27.9	13.2	28.5	13.7	28.9	14.0	29.3	14.3	29.6	14.6	29.9	14.9	30.2	15.2	30.5	15.5	30.8	15.8	31.1	16.1	31.4	16

TABLE 11.

TABLE 11—(Continued). ILLUSTRATIVE CLIMATOLOGICAL DATA FOR AGRICULTURAL LANDS

by the sixteen sections of the State.*
Data from U. S. Weather Bureau records for selected stations within the agricultural areas of each section.*

TEMPERATURE: Monthly and annual means.												PRECIPITATION: Monthly and annual means.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Frost free period.												U. S. Weather Bureau Stations.												Elevation.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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REMARKS.—* See page 26 and map, Plate V. (a) Av.—Average number of days free from killing frosts for all years of record. (b) Ab.—Absolute number of days between latest recorded spring frost and earliest recorded fall frost, for all years of record; these frosts not necessarily occurring in same year.

TABLE 11.

TABLE 11—(Concluded). ILLUSTRATIVE CLIMATOLOGICAL DATA FOR AGRICULTURAL LANDS
by the sixteen sections of the State.*

Data from U. S. Weather Bureau records for selected stations within the agricultural areas of each section.*

TEMPERATURE: Monthly and annual means.													PRECIPITATION: Monthly and annual means.												
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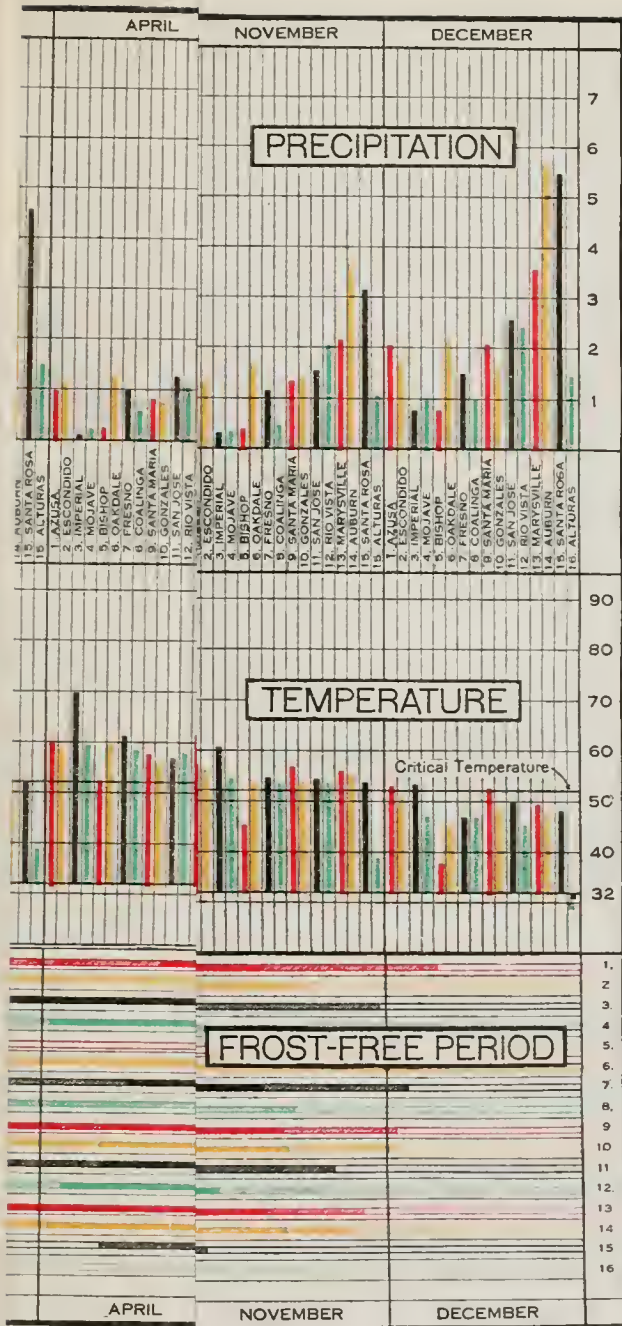
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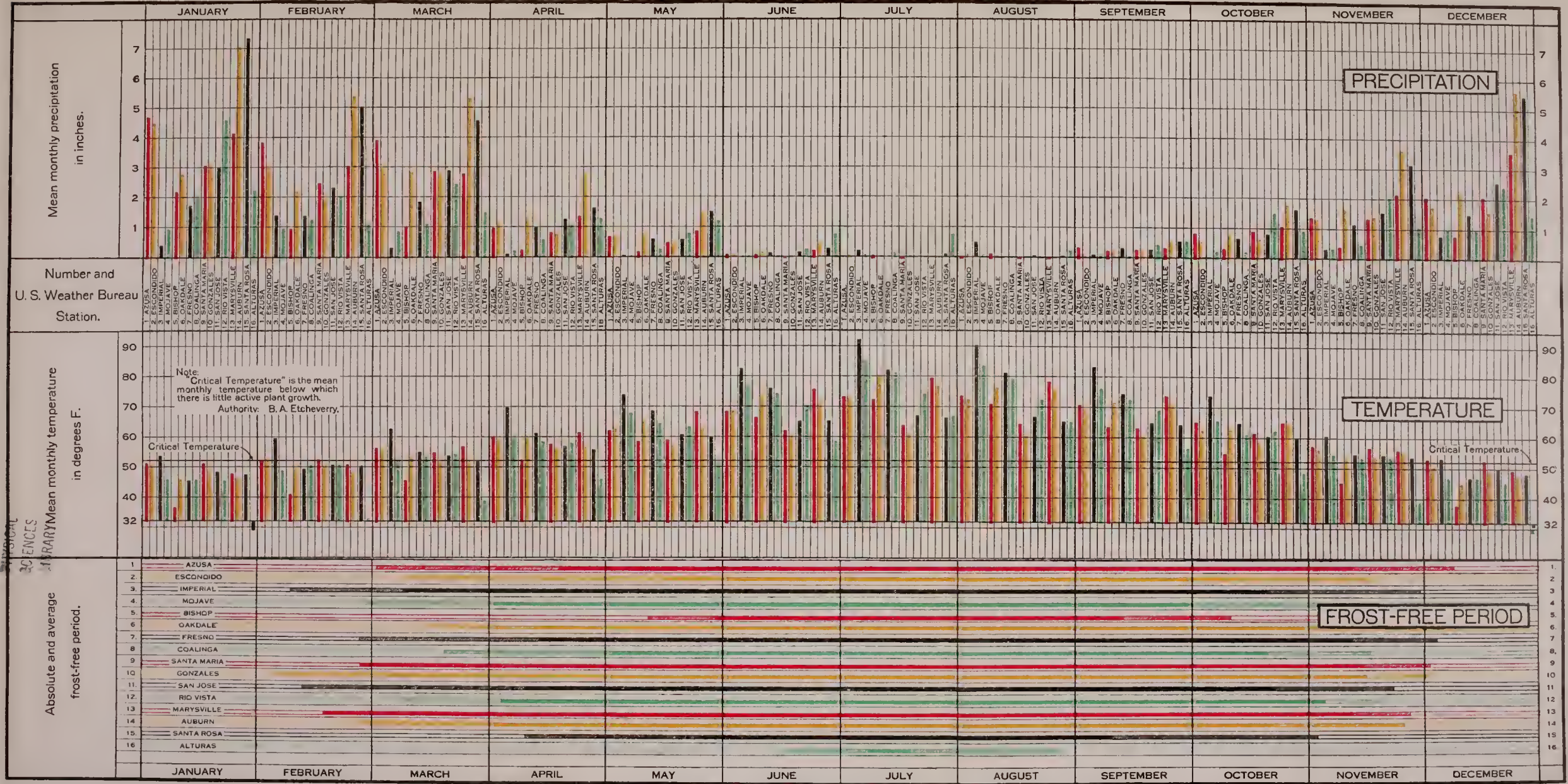
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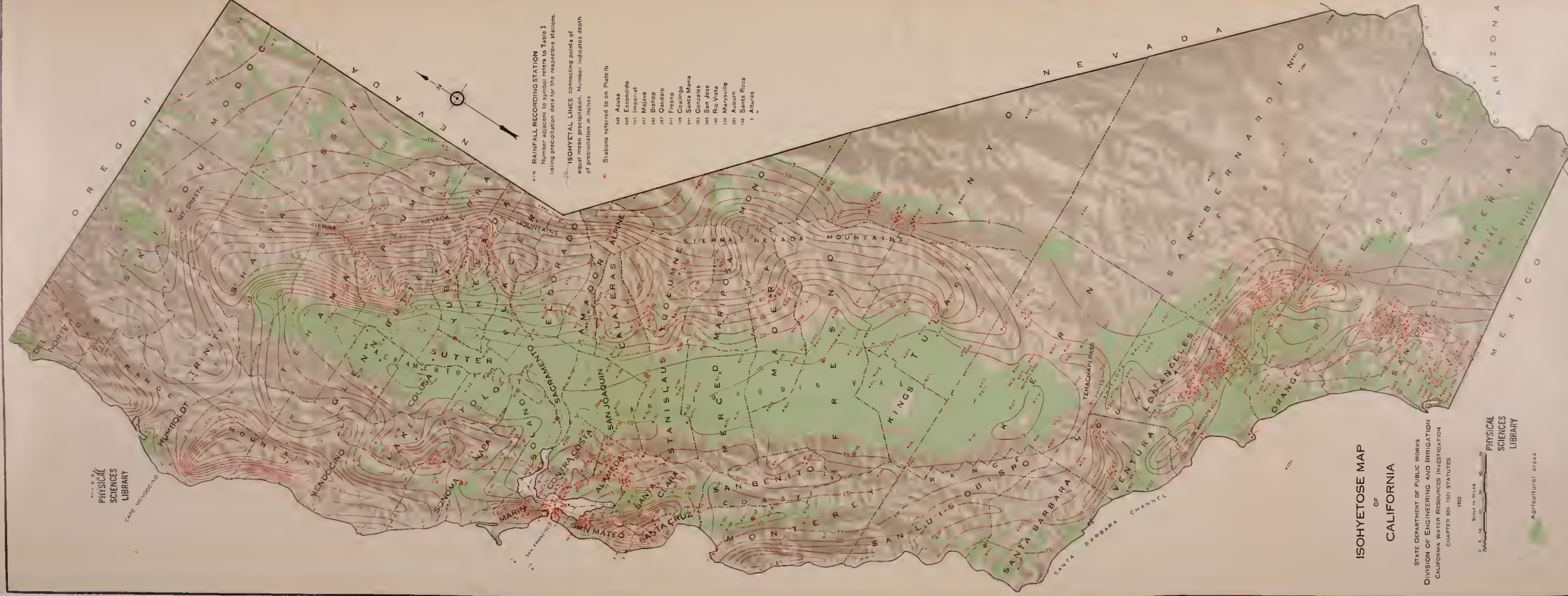
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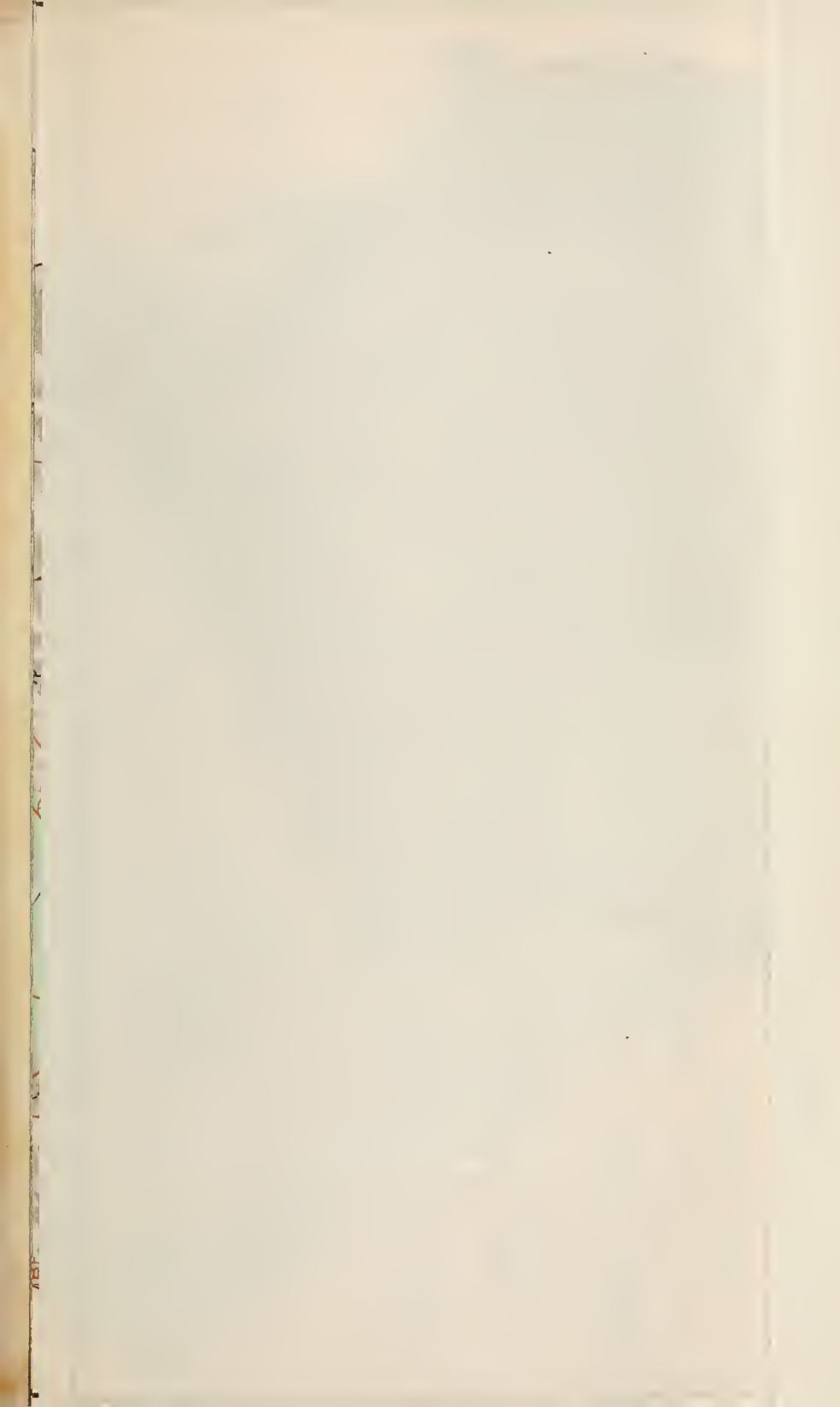
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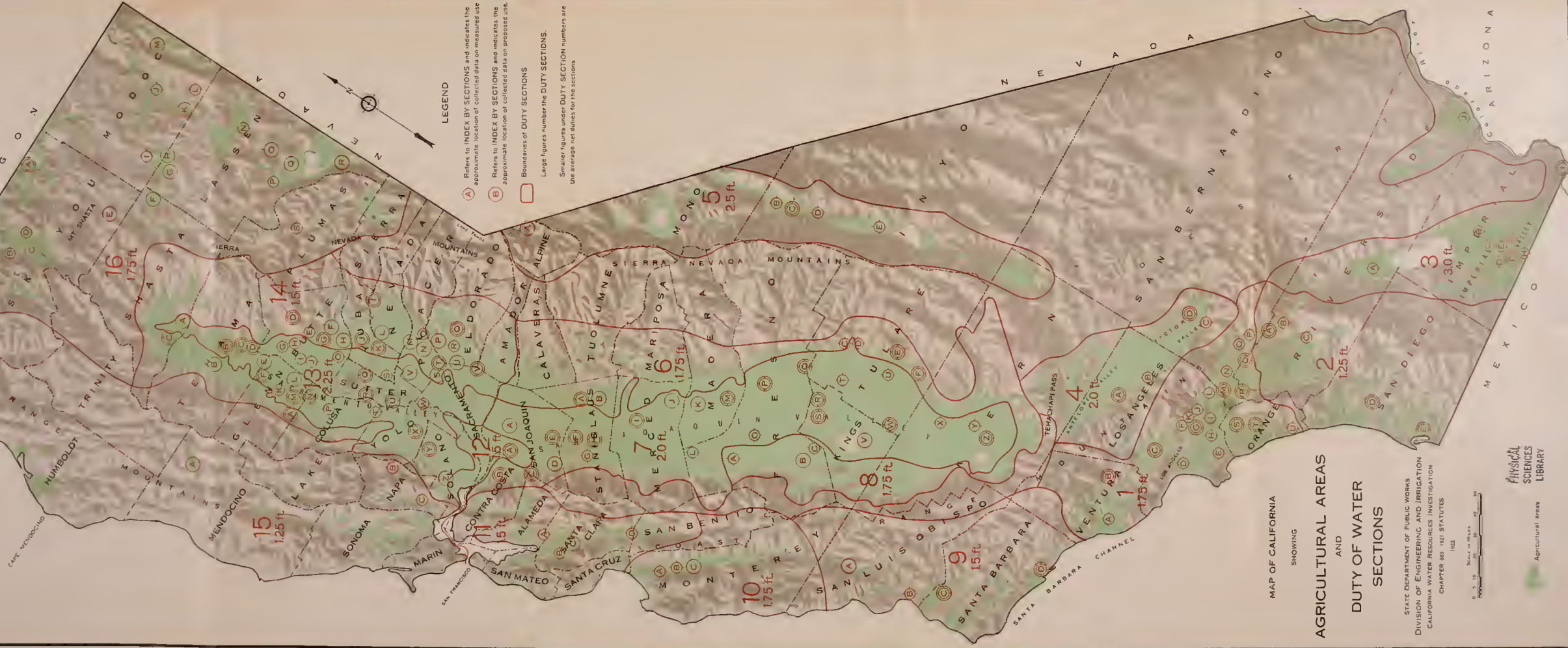
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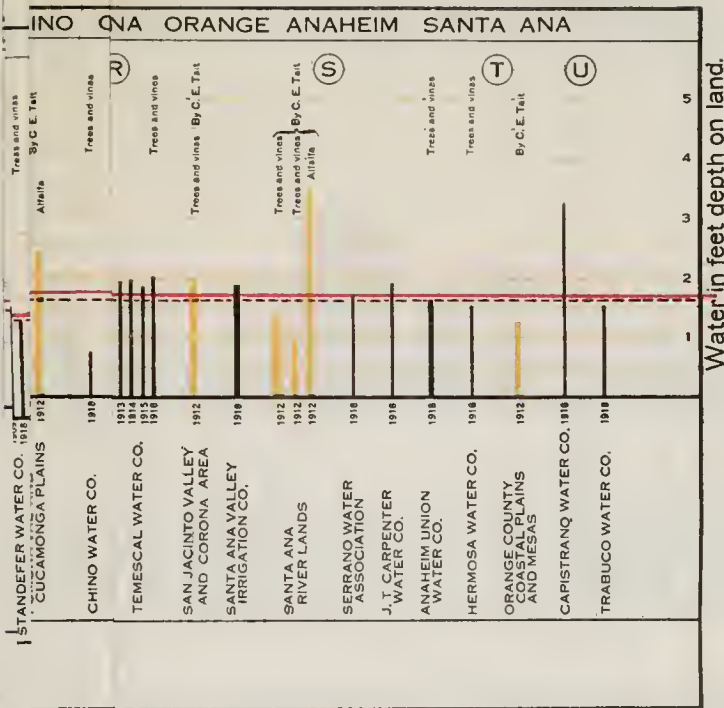
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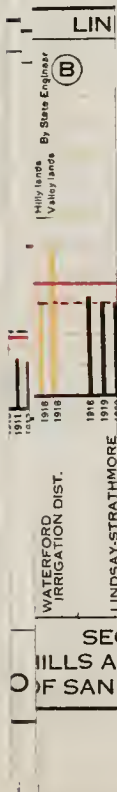
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Scale in miles
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Water in feet depth on land.

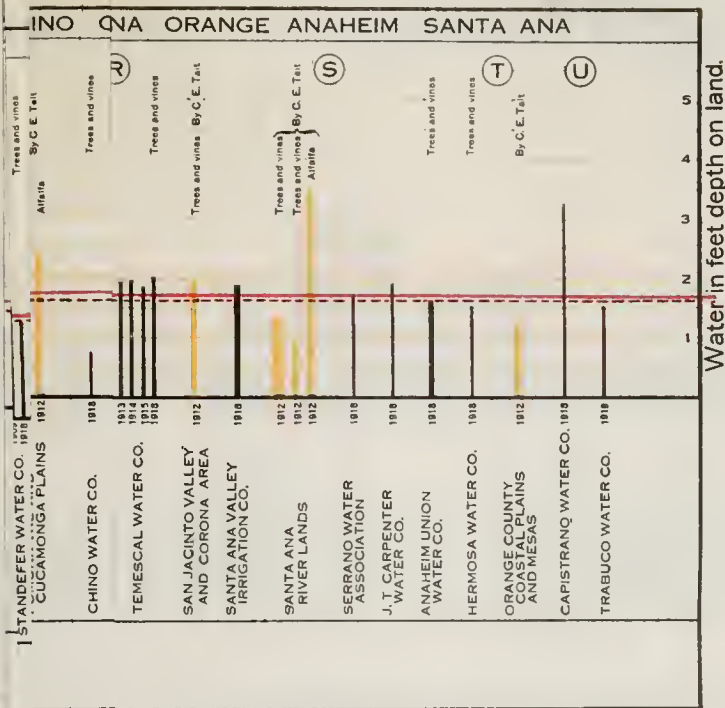


NET USE OF WATER MEASURED AND PROPOSED ON VARIOUS SYSTEMS

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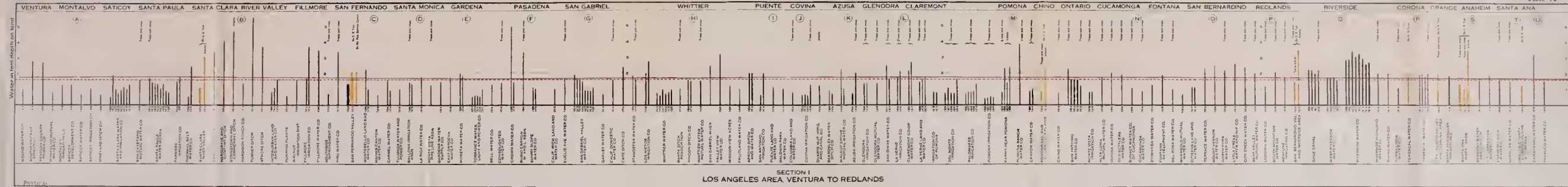
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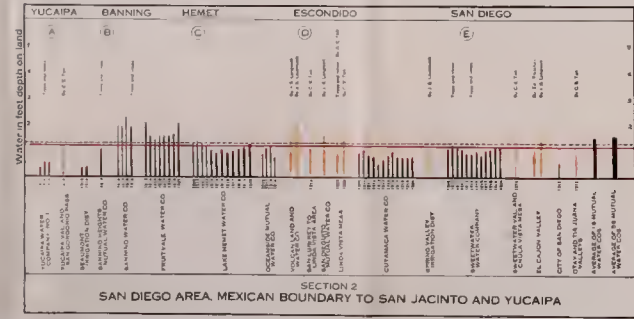
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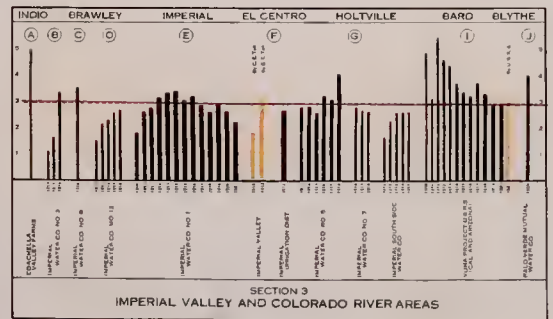
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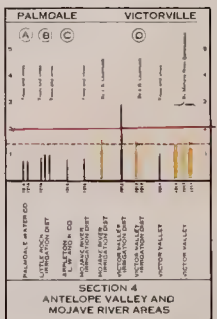
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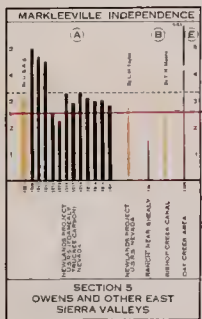
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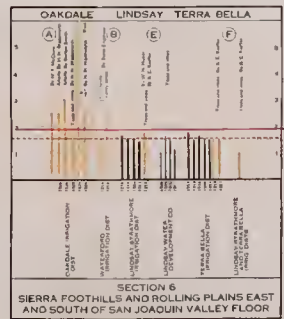
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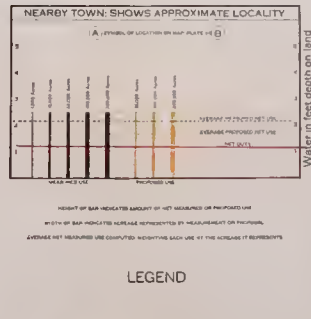
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OWENS AND OTHER EAST SIERRA VALLEYS



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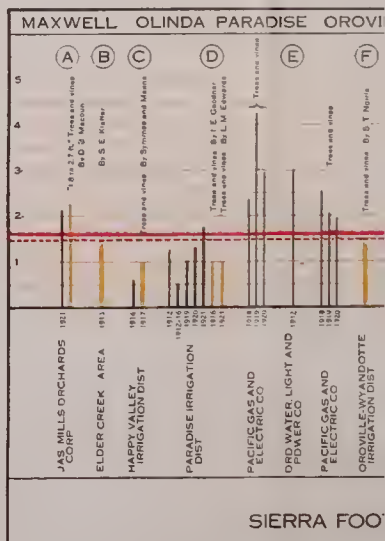
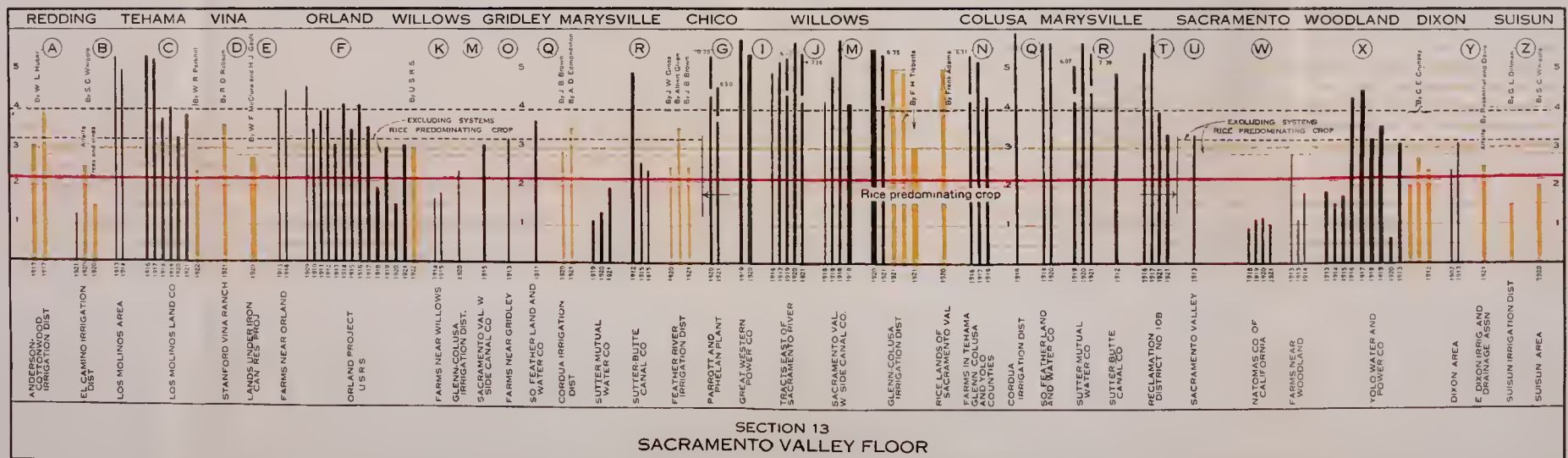
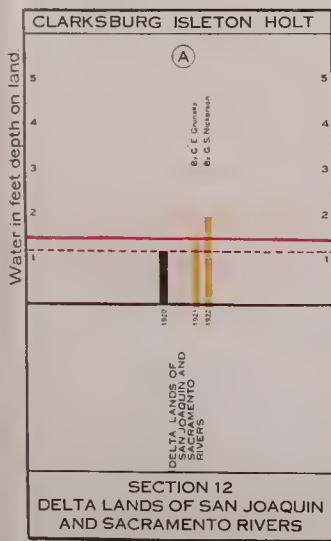
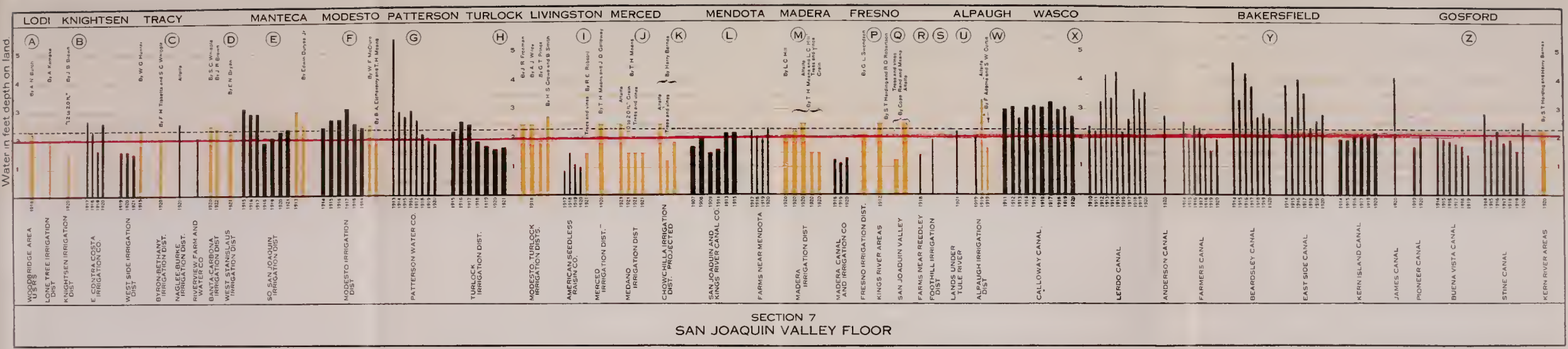


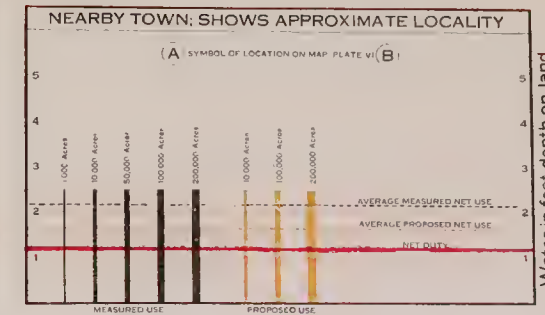
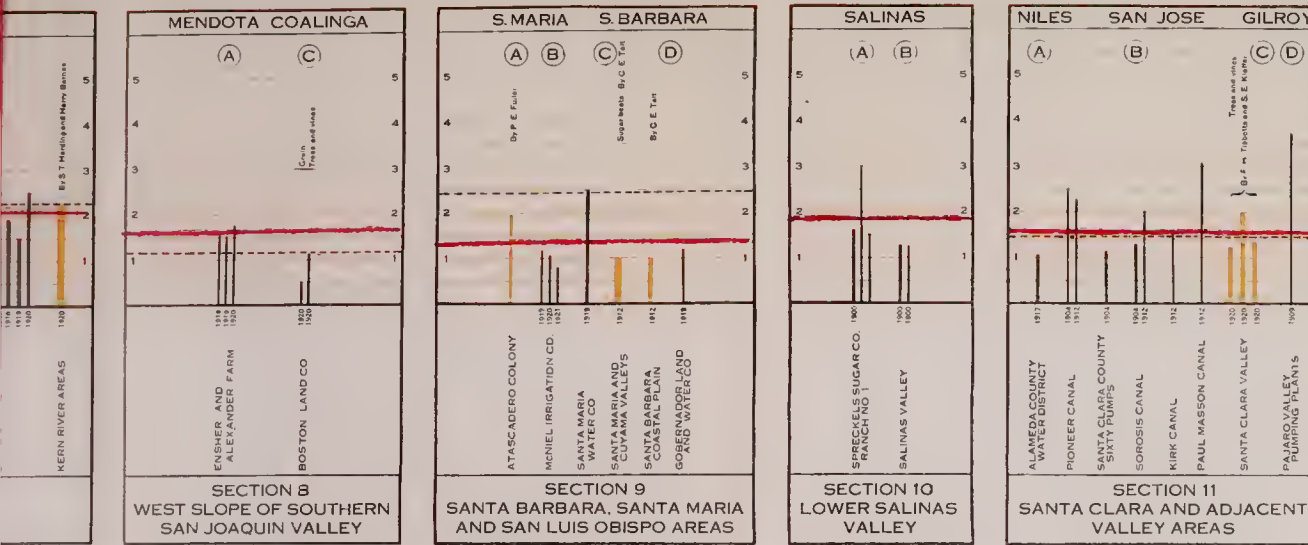
LEGEND

NET USE OF WATER
AS MEASURED AND PROPOSED
ON VARIOUS SYSTEMS

STATE DEPARTMENT OF PUBLIC WORKS
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CALIFORNIA WATER RESOURCES INVESTIGATION
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PHYSICAL
SCIENCES
LIBRARY



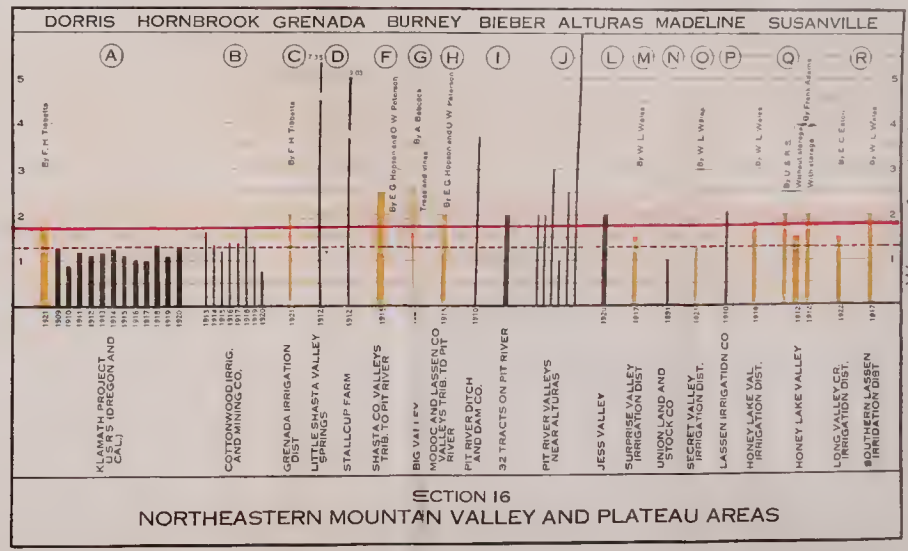
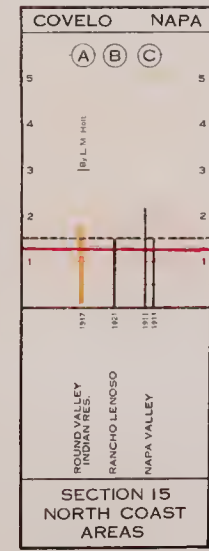
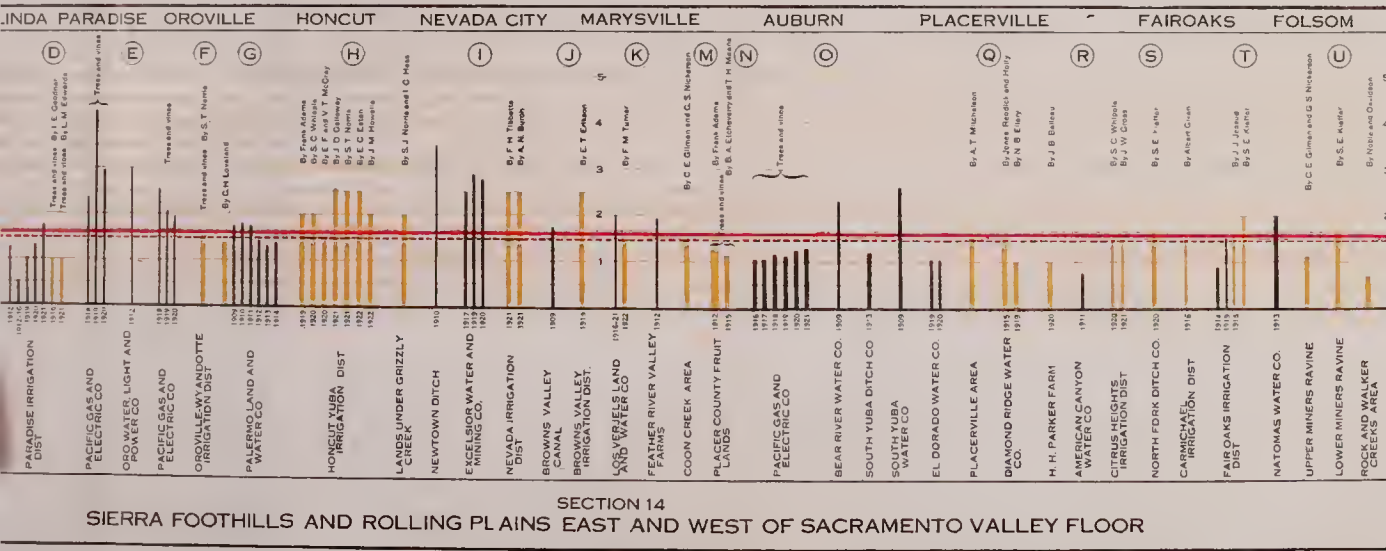


Water in feet depth on land

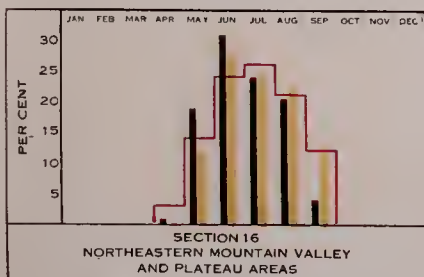
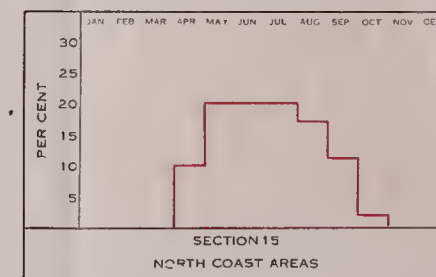
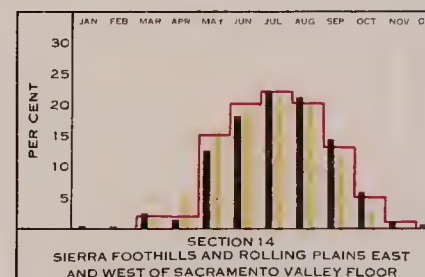
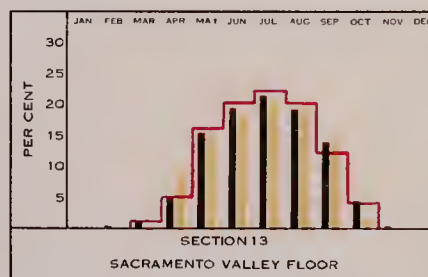
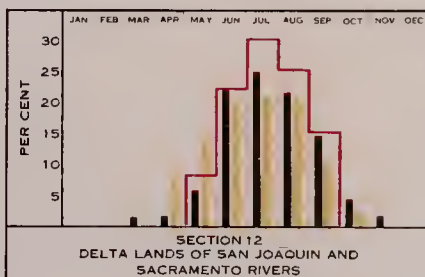
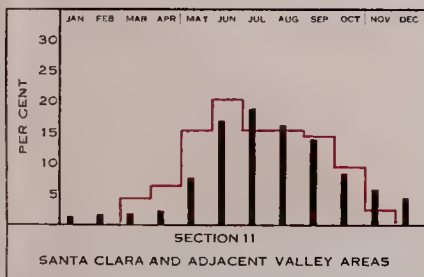
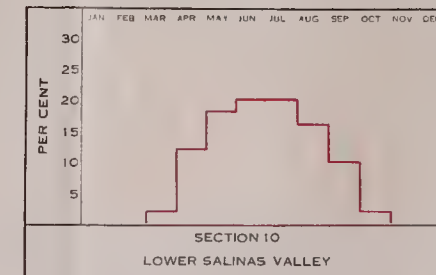
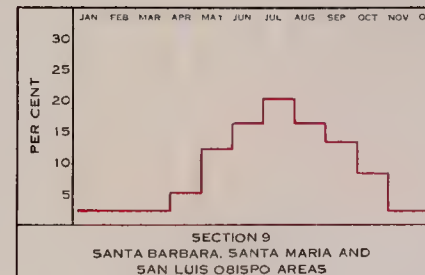
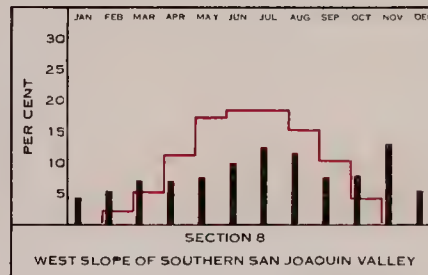
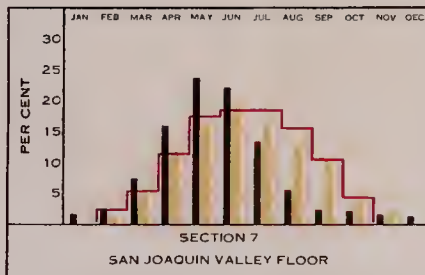
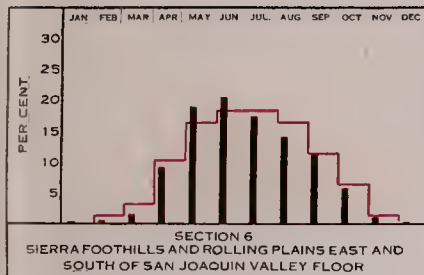
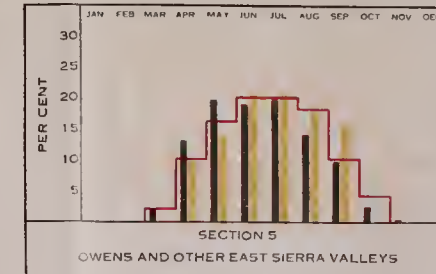
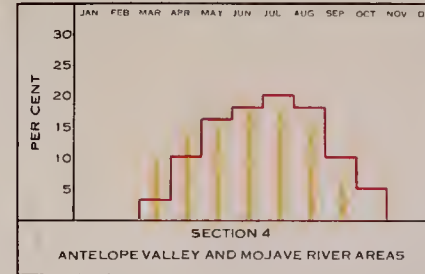
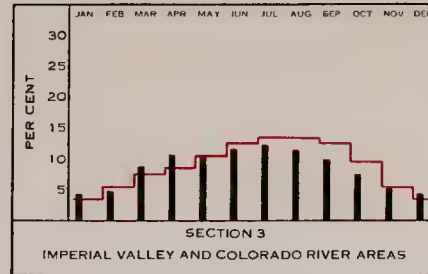
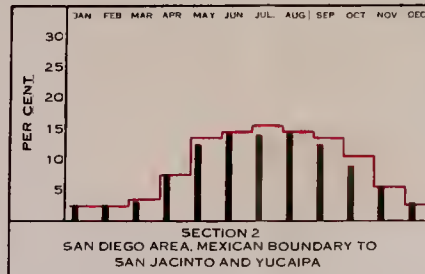
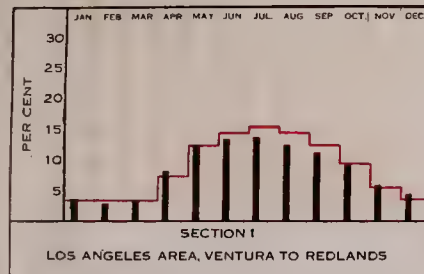
NET USE OF WATER AS MEASURED AND PROPOSED ON VARIOUS SYSTEMS

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 CALIFORNIA WATER RESOURCES INVESTIGATION
 CHAPTER 309 1921 STATUTE 2




LEGEND



Water in feet depth on land



LEGEND

-  Weighted average measured monthly use.
-  Average proposed monthly use.
-  Desirable monthly use.

Ordinates show percentage of yearly use

MONTHLY USE OF ANNUAL IRRIGATION SUPPLY

STATE DEPARTMENT OF PUBLIC WORKS
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CALIFORNIA WATER RESOURCES INVESTIGATION
CHAPTER 889 1921 STATUTES

